SOUTHERN POWER AND INDUSTRY

Ad Index, Page 128

AUGUST, 1954

In This Issue

Baltimore's Canton Ore Pier

Conveyor belt system, storage weigh hopper, and new modern electric unloading crane provide flexibility in bulk material handling.

Starts page 56

OG&E's First Outdoor Station

Plant serves South Central Oklahoma. Design features include artesian wells, centralized control and pressurized boilers.

Starts page 64

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Key Man for Results

Starts page 74

ALLIS-CHALMERS
Totally-Enclosed Fan-Cooled MOTORS

INDOORS or OUT

DIRT and CORROSION

Can't Hurt These Motors

Here is a totally-enclosed type of motor that will solve many of your dirt and corrosion problems. Install anywhere, indoors or out.

Cooling System is Self-cleaning

Cooling air is carried through the heat-exchanger tubes with sufficient velocity to expel practically any kind of dirt. If oily or sticky dirt should cling, tubes can be ramrodded clean in a few minutes because tubes are straight and tube ends are exposed.

Choice of Corrosion-resistant Materials

You can lick corrosion with this motor, too. Tubes are available in a variety of materials to meet practically any corrosive atmospheric condition. Allis-Chalmers tube-type motors have long and successful experience in such difficult applications as caustic plants, refineries and petrochemical plants, power plants with fly ash problems and many others.

Next time you need a motor for a dirty or corrosive location or for outdoor operation in all kinds of weather, call your Allis-Chalmers District Office. Get complete information on Allis-Chalmers tube-type totally-enclosed, fan-cooled and explosion-proof motors. Or write Allis-Chalmers, Milwaukee 1, Wisconsin, for Bulletin 51B7149. Available in ratings on frames larger than NEMA 505 up to 3000 hp.

A-4222

Texrope and Vari-Pitch are Allis-Chalmers trademarks.

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Applied . . .
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by Allis-Chalmers Authorized Distributors, Certified Service Shops and Sales Offices throughout the country.

CONTROL — Manual, magnetic and combination starters; push button stations and components for complete control systems.

TEXROPE V-belts in all sizes and sections, standard and *Vari-Pitch* sheaves, speed changers.

PUMPS — Integral types from ¾ in. to 72 in. discharge and up.

ALLIS-CHALMERS

SOUTHERN POWER & INDUSTRY is published monthly at 56th & Chestnut Sts., Philadelphia 39, Pa., by W. R. C. Smith Publishing Co. Executive and Editorial Offices: 806 Peachtree St., N.E., Atlanta 5, Ga. Entered as second-class matter at the Post office, Philadelphia, Pa. Subscription Rates: United States and Possessions, $1.00 per year or three years for $2.00; Foreign Countries, $10.00 per year.

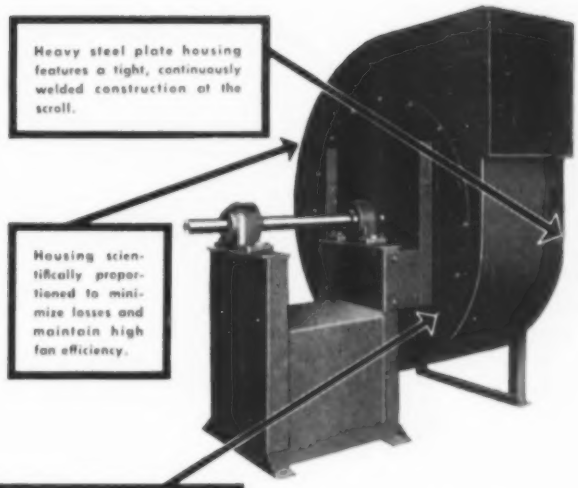
Volume 72 Number 8

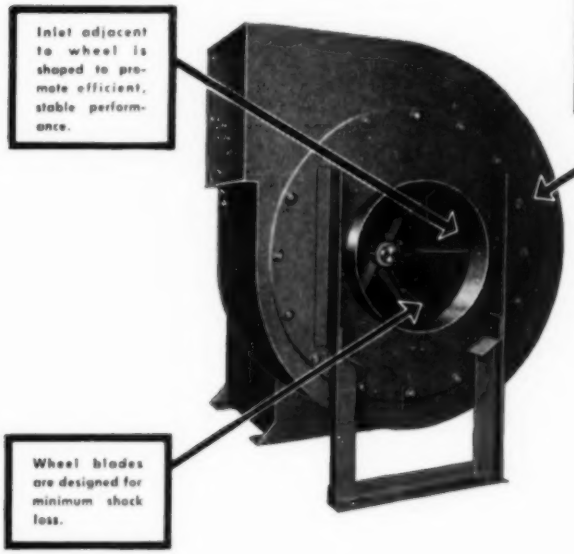
Announcing

the new Clarage TYPE XL Industrial Fans

Exceptional Fan Equipment distinguished by:

1. High efficiency characteristic.
2. Rugged, tight construction.
3. Three interchangeable wheels — each with radial blades.
4. Large size range — 11" through 60" inlet diameters.
5. Pressures to 18" SP; volumes to 130,000 CFM.


Heavy steel plate housing features a tight, continuously welded construction at the scroll.
Housing scientifically proportioned to minimize losses and maintain high fan efficiency.
Adjustable to any of eight standard discharges by merely removing tap bolts on each side and rotating the housing between the sideplates.


Inlet adjacent to wheel is shaped to promote efficient, stable performance.
Wheel blades are designed for minimum shock loss.

Type XL fans shown here are typical of the smaller sizes which provide universal discharge. Larger sizes are of reinforced sheet steel and base angle construction extending to the foundation line.

Send for Bulletin 702

A new, modern design offering many distinct advantages!

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Learn more about these distinguishing features by requesting Bulletin 702, or contacting the nearest Clarage application engineering office.

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CLARAGE

Headquarters for Air Handling and Conditioning Equipment

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A Texaco Lubrication Engineer will gladly help you make the proper selection for your turbines. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write the Texas Company, 135 East 42nd Street, New York 17, N. Y.

TEXACO

TEXACO Regal Oils R&O

FOR ALL TURBINES

SOUTHERN POWER AND INDUSTRY

AUGUST 1954

Vol. 72
No. 8

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Facts and Trends

FOR SOUTHERN INDUSTRIAL AND POWER EXECUTIVES

August, 1954

► FASTEST UNLOADING CRANE on the Atlantic Seaboard, modern conveyor belt system, and an "automatic" storage-weigh hopper now provides the Canton Ore Pier in Baltimore, Maryland, with a rated capacity of 3,000 tons per hour.

Engineering details of the entire installation are featured in this issue. Conveyor belt system includes a "high line" belt running from one end of the pier 1336 ft to a transfer station. Slope conveyor, 276 ft long, lifts ore to storage-weigh hopper. Both belts are 48" wide vulcanized rubber. System was designed and construction supervised by Hewitt-Robins, Inc.

Huge electric unloading crane, weighing approximately 1035 tons, incorporates the latest design and engineering in bucket handling equipment. Adjustable voltage drive (General Electric) uses amplidynes (rotating regulators) to produce refinements in peak torque requirements and simplification of control equipment with consequent reduced maintenance.

► ELECTRICALLY POWERED and controlled tractors, being manufactured by LeTourneau's Longview, Texas, plant, feature the interesting Electric Wheel. Inside the rim of the wheel, a high-torque motor is geared to deliver immediate driving power in either direction. Each wheel drives, has brakes, and can be steered.

Power is delivered to each wheel from a diesel-driven generator. The Electric Wheel is thus a unit prime mover which delivers positive, controllable power without transmissions, torque converters, final drives, clutches, or other power-loss assemblies.

► TOOL REPAIR TAGS at Temco Aircraft in Dallas, Texas, do DOUBLE DUTY--assist both in tool repair and in the inventory of parts used in repair. One side lists services needed most frequently for small electric air tools. Operator simply checkmarks applicable item. Card's opposite side has columns in which parts used in repair are logged. The card--except for a detachable stub--is filed as a permanent tool repair record.

► MODERN POWER DISTRIBUTION SYSTEM at Chicago Pneumatic's $4,500,000 plant in Fort Worth, Texas, was designed for maximum utility and future growth. Power for the 3-phase, 480 volt system is obtained from four indoor load center type substations. Two, side by side, serve concentrated loads of welding and heat treating departments; the other two serve manufacturing area. There is reserve capacity to meet 70% increase in present load.

The two side-by-side substations are tied together on the secondary side so that one can carry the essential loads of both should there be a feeder or transformer failure. Although the other two substations are not tied together, reliability and flexibility are pro-

(Continued on page 6)

MULTI-UNIT CONTROL PANELS

•

EASY TO ADD
EASY TO CHANGE
to meet
Plant Requirements

•

Available with
Manual Disconnect Units
or Circuit Breakers

Plug-in panels are ideal for continuous process industries which must be serviced while the bus is "hot." Fixed connection Multi-Unit Control Panels are popular for most industries.

CENTRALIZED MAINTENANCE

Centralized location of all motor controls promotes regular inspection, discourages tampering by unauthorized personnel, and does away with special mounting provisions so often needed for groups of starters. A-B Multi-Unit Control Centers can be installed more quickly than an equivalent number of separate starters, disconnect units, and accessories.

GREATER PLANT SAFETY

Not only do Allen-Bradley Multi-Unit Control Centers reduce the hazards of accidental personal contact with "live" switch gear . . . they also make possible the centralizing of motor controls in rooms far removed from hazardous gases, dusts, or fumes. They may even be installed out of doors in weatherproof cabinets. Send for Bulletin 798 for details.

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CONSULT YOUR LOCAL ALLEN-BRADLEY REPRESENTATIVE

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CHARLESTON—W. J. Hess, Room 302 Morrison Bldg., 815 Quarrier St., Tel: 2-5323
CHARLOTTE—Le Roy P. Spoon, 307 Lincoln St., Tel: 4-6334, 6-4301
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HOUSTON—Wilson Electrical Equip. Co., 2930 Commerce Ave., Tel: Atwood 1557
JACKSONVILLE—Robert P. Smith Co., 2031 Hendricks Ave., Tel: 9-9474
KANSAS CITY—B. L. McCreary & Son, 1819 Central, Tel: Harrison 1668
KNOXVILLE—Bowditch & Co., 1311-C N. Broadway, P. O. Box 3145, Tel: 4-2513
LITTLE ROCK—Curtis H. Stout & Co., P. O. Box 107, 400 Shall St., Tel: 4-8835
LOUISVILLE—Rietze & Co., 139 S. 5th St., Tel: Clay 7716-7
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NEW ORLEANS—Robbins & Robbins, 1037 Magazine St., Tel: Canal 5805
ST. LOUIS—G. W. Schalchlin, 904 No. Grand Blvd., Tel: Lucas 1901-02
SAN ANTONIO—Wilson Elect. Equip. Co., 101 E. Maple St., Circle 4-1471
SAN DIEGO—James A. Satchell, 301 W. "G" St., Tel: Franklin 3981
TULSA—John W. Elder Co., 1526 East Fourth St., Tel: 3-9149

vided. Plug-in bus duct sectionalizing devices permit a load to be shifted from one substation to the other.

Use of a 277 volt lighting system reduced the number of required branch circuit wiring and panel boards and eliminated the need for transformers to step-down the voltage.

► GOOD HOUSEKEEPING makes money for Fairchild Aircraft in Hagerstown, Maryland. They don't just aim to put-on-a-show. Top notch program influences efficiency and safety makes money. The show takes care of itself.

One negative approach is unquestionably positive in results. Occasionally, an unfortunate department is presented the Hog Award. It is a large sign, some 6 by 4 ft, painted on both sides, showing a typical hog pen with litter about, and the wording THIS IS THE SLOPPIEST DEPARTMENT IN THE PLANT. It doesn't have to be used too often, but when it is, it takes effect quite promptly.

► TELEGRAPHING SPARE PARTS is an interesting possibility predicted for tape-controlled machine tools. Employing the principle of the player piano roll--holes punched on a tape--lathes and other machine tools can be made to follow a pattern to reproduce parts automatically and in great quantities. If the pattern information can be put on teletype tape, it can be telegraphed to distant places to control machine tools on the spot.

For instance, when orders come in for spare parts, the tape is taken out of the file and put in the machine. The operator does not need to know what the machine is going to make. All he has to know is what size of stocks to put in and where to put it.

For simple pieces, tapes are made in the user's plant; for complicated jobs they can be prepared on computing machines. The Arma Corporation discusses the tape control principle and other mechanical and electronic duplicating devices in the June issue of Mechanical Engineering.

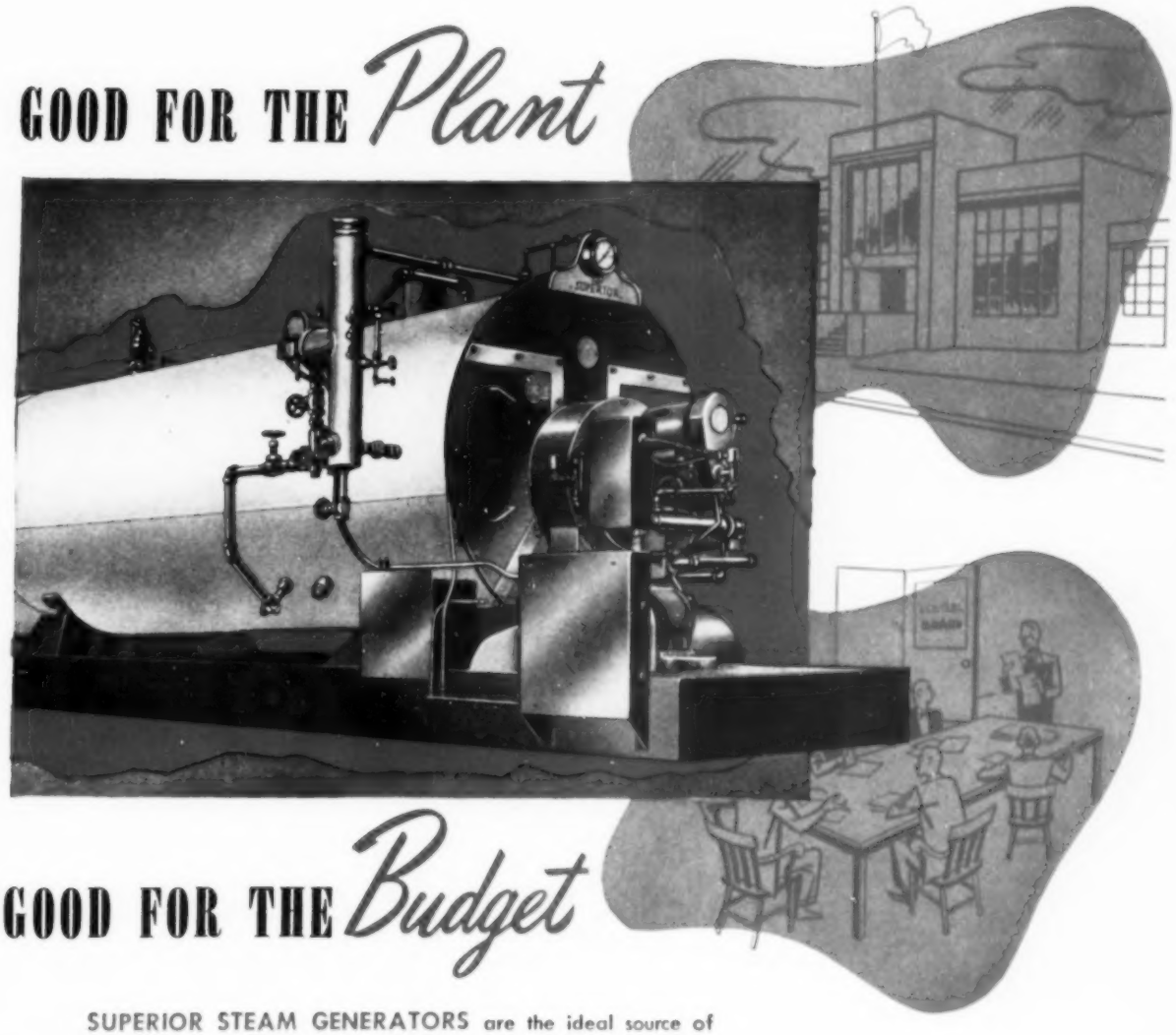
► WORLD'S LARGEST CIRCUIT BREAKER, first ever built to interrupt currents equivalent to 25,000,000 kva, will be installed on the nation's first 330,000 volt power transmission network of the American Gas and Electric System. The 83 ton, 25 ft high G-E breaker was recently shipped to the Philip Sporn generating station at New Haven, West Virginia. Plant is owned and operated jointly by The Ohio Power Company and Appalachian Electric Power Company.

► HOW PHOTOGRAPHY developed into a valuable maintenance tool at Southwestern Public Service Company at Amarillo, Texas, will be featured in an early issue of SP&I. Four years ago occasional photos, included in reports of unusual equipment conditions or machine failures, began to point out other applications of accurate, detailed photography.

Photos are now used extensively in maintenance records of overhauls on heavy equipment. Turbines, generators, large pumps, etc., can only be opened every three years for inspection. Comparisons of current findings with the records of previous overhauls are more easily and accurately made if photos are a part of the records.

Write the editors for additional information on any of the above items. SOUTHERN POWER & INDUSTRY. 806 Peachtree St., N.E. Atlanta 5, Ga.

GOOD FOR THE *Plant*



GOOD FOR THE *Budget*

SUPERIOR STEAM GENERATORS are the ideal source of steam for heat or process. Completely *factory assembled*, and *factory tested* to insure capacity operation at thermal efficiencies guaranteed to exceed 80%, they are backed by undivided responsibility. Installation is simple and inexpensive. Rugged and compact, they need no special foundation, fit in limited space with low overhead.

Superior's *built-in* induced draft eliminates the need of an expensive chimney and avoids the forcing of combustion gases into the boiler room.

Superior Steam Generators reduce maintenance to a minimum and in many cases earn their total cost in less than 2 years through operating economies resulting from high efficiency.

Dependable, quiet performance, plus economies of installation and operation, make Superior the ideal steam plant.

Fully automatic, Superior Steam Generators burn gas, oil, or both. Sizes from 20 to 600 bhp. for pressures to 250 psi. or for hot water. Battery installations provide maximum flexibility for higher capacities. Write for catalog 611.

for performance you can **BANK** *on*

SUPERIOR COMBUSTION INDUSTRIES INC.
TIMES TOWER, TIMES SQUARE, NEW YORK 36, N.Y.

SUPERIOR
STEAM GENERATORS

NEWS *for the South and Southwest*

R. G. LeTourneau Expands in Diversified Equipment Lines

A little more than a year ago, R. G. LeTourneau, Inc., sold the earthmoving equipment part of its business and more than half its manufacturing facilities. At that time, many predicted that selling the profitable 25 year old earthmoving business to Westinghouse Air Brake would be suicidal and lead to the finish of the LeTourneau Company.

In the recently released annual report of R. G. LeTourneau, Inc., Longview, Texas, R. G. LeTourneau, president, said, ". . . contrary to the thinking of some . . . we are still very much in business."

The company looks anything but finished. New products in the industrial and materials handling fields are coming out of the Texas and Vicksburg, Mississippi, factories. R. L. LeTourneau, vice president in charge of sales, has stated that in the year since it quit the earthmoving equipment business, the Company has: Introduced an entirely new packaged power system for heavy equipment—the Electric Wheel; opened a new field for contracting by marketing a fast-cutting, self-propelled Tree Saw and a companion Land Clearing Tractor; produced large-capacity Revolving Cranes and Jackknife Cranes for transporting as well as lifting multi-ton cargoes; developed the rubber-tired, trackless LeTourneau Train for transport of cargo and passengers across rough and unimproved terrain;

R. G. LeTourneau

". . . . contrary to the thinking of some . . . we are still very much in business."

designed the LeTourneau Transporter in several models applicable to the logging and overseas development fields; and designed the LeTourneau Off-Shore Drilling Platform, a movable platform with electro-mechanically raised and lowered legs for use in water up to 100 ft deep.

In the industrial and materials handling fields, LeTourneau is manufacturing and selling electric hoists and jib cranes, electric motors, generators and generator sets. At the Company's Vicksburg, Mississippi, plant, development is being pushed on diesel-electric marine equipment.

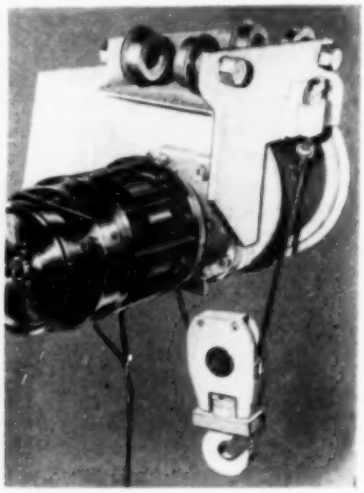
With the early demand for the new equipment, LeTourneau is today expanding its manufacturing facilities at both Longview and Vicksburg.

LeTourneau is looking to land clearing as one of the first large markets for its new machinery. The Company claims that for the first time land clearing has the equipment that makes it a specialized and profitable branch of contracting. To demonstrate the speed and utility of the new machinery, the Company subcontracted a 16,000-acre land clearing job for a government dam and flood control reservoir. This work, near Texarkana, 90 miles from Longview, consists of clearing heavy forest from the soft, boggy terrain of the Sulphur River bottom lands. LeTourneau moved its new Tree Saws and LC Tractors to the site in July, 1953. By December, with the saws and tractors working as teams, more than 6,000 acres had been cleared. Machine teams of one saw and one tractor—each machine with but a single operator—have averaged clearing from 12 to 15 acres per ten-hour shift.

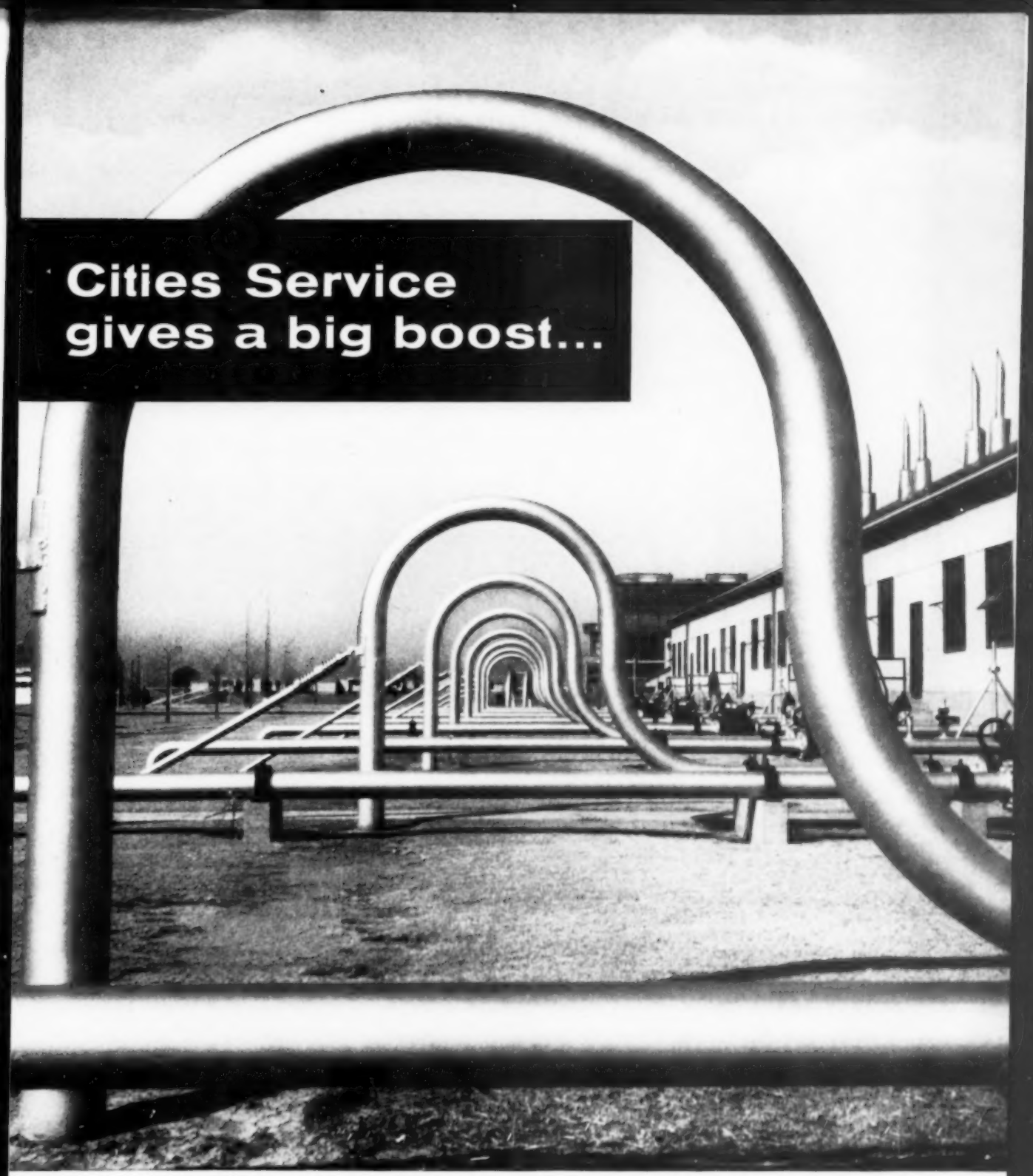
Domestic and international marketing of the new LeTourneau equipment under the direction of Vice President R. L. LeTourneau is being set up through both exclusive and non-exclusive distributors, with direct factory sales on certain items.

LeTourneau general offices are now located at Longview, Texas. Sales offices have been established at Washington, D. C.; Seattle, Washington; New Orleans, Louisiana; and Atlanta, Georgia. Additional U. S. and foreign offices are planned.

ELECTRICALLY powered and controlled LC Tractors by LeTourneau are manufactured in sizes that meet various job requirements. Tractors have four-wheel drive, four-wheel steering, and large wide-base, low pressure tires. Each wheel drives, has brakes, and can be steered. Power is delivered to each wheel from a diesel-driven generator. Electric wheel is a unit prime mover which delivers positive controllable power without transmissions, torque converters, final drives, clutches, or other power-loss assemblies.



ELECTRIC HOISTS of 4, 5, and 6 ton capacities have wire rope lift, with swivel hook suspended on a two-part line. Other items in the LeTourneau materials handling line include 360° Jib Cranes, Floating Gantry Crane, and a 20 ton capacity mobile crane.



Every minute, day in day out, 1,200,000 cubic feet of natural gas are pushed through pipe lines by the 220,000 horsepower in our booster stations.

CITIES SERVICE

A Growth Company

News for the South and Southwest (continued)

Swartwout—Virginia

Appointment of I. RUSSELL BERKNESS COMPANY, 615 E. Franklin St., Richmond 19, Va., as sales and service representatives for power plant and Autronic process control equipment for the state of VIRGINIA is announced by THE SWARTWOUT COMPANY, Cleveland, Ohio.

Russell Berkness

Territory will be the entire state of Virginia with the exception of those counties immediately adjacent to the District of Columbia and those in the extreme western portion of the state. Campbell King, Jr., will continue to represent the industrial ventilation division of Swartwout in this territory.

Atlantic Steel Names Kelley

ALEX C. KELLEY has been named manager of ATLANTIC STEEL COMPANY'S Fabricating Division. In his new capacity, he will direct the company's sales of fabricated reinforcing bars, welded wire mesh and accessories to the construction field.

Alex C. Kelley

A licensed professional engineer, Kelley has been with Atlantic Steel Company since 1953. Prior to that time, he was connected with the N. C. & St. L. Railway, and with Wilson-Weesner-Wilkinson, a Nashville fabricating and construction equipment firm.

Kelley is a native of Mt. Juliet, Tennessee. He received his education in Nashville and is a graduate of Vanderbilt University with a degree in civil engineering. He is an associate member of the American Society of Civil Engineers.

McGinn Named Manager of Stud Welding Co.—Houston

RICHARD J. MCGINN has been named manager of STUD WELDING CO., INC., with headquarters at 5915 Clinton Drive, HOUSTON, TEXAS. The company handles distribution of Nelson stud welding equipment and products in Texas, Oklahoma, Arkansas and western Louisiana and maintains factory branch warehouses in Houston and Dallas.

Richard J. McGinn

McGinn, who transferred to Houston in January after three years as a field manager for the Nelson Stud Welding Division of Gregory Industries, Inc., in the Philadelphia territory, is a graduate of Bucknell University where he received a BS degree in Economics.

Richardson Scale Opens New Branch Office in Memphis

RICHARDSON SCALE CO., Clifton, N. J., manufacturer of industrial weighing and materials handling equipment, announces the opening of new branch office at 211½ Court Ave., Memphis, Tenn., and the appointment of GUS BAURNFIND as branch manager.

Territory assigned to the Memphis office will include Arkansas, Mississippi, Louisiana and parts of Western Tennessee. This territory was formerly covered out of the Company's Atlanta office.

Richardson Scale has also moved its ATLANTA, GEORGIA, branch office to 423 Grant Building. E. C. MOTT will continue as Atlanta branch manager.

FUTURE EVENTS
Of Engineering Interest

APPALACHIAN GAS MEASUREMENT SHORT COURSE, R. E. Hanna, Jr., Chm. Housing & Registration, West Virginia University, Morgantown, W. Va.
Aug. 23-25, 14th Annual Session, West Virginia University, Morgantown, W. Va.

INSTRUMENT SOCIETY OF AMERICA, Mg. Dir., First International Instrument Congress & Exposition, 845 Ridge Ave., Pittsburgh 12, Pa.
Sept. 15-21, First International Instrument Exposition, Philadelphia Convention Hall, Philadelphia, Pa.

PUBLIC UTILITIES ASSOCIATION OF THE VIRGINIAS, Robert W. McKinnon, Exec. Sec'y, 5 Franklin Road, Roanoke, Va.
Sept. 16-18, Thirty-Sixth Annual Meeting, The Greenbrier, White Sulphur Springs, W. Va.

NATURAL GASOLINE ASSOCIATION OF AMERICA, William F. Lowe, Sec'y, 422 Kennedy Bldg., Tulsa 3, Okla.
Sept. 17, Oklahoma Regional Meeting, Skirvin Hotel, Oklahoma City, Okla.
Oct. 29, Southern Regional Meeting, Blackstone Hotel, Tyler, Texas.
Dec. 3, Panhandle-Plains Regional Meeting, Herring Hotel, Amarillo, Texas.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS, Harold M. Furney, Chm. Tulsa Section, 1610 E. 32nd Place, Tulsa 5, Okla.
Sept. 27-29, Electrical Conference for the Petroleum Industry, Mayo Hotel, Tulsa, Okla.

PETROLEUM ELECTRIC POWER ASSOCIATION, W. L. Pearson, Sec'y, P. O. Box 1261, Amarillo, Texas.
Oct. 4-6, Twenty-Sixth Anniversary Meeting, Jung Hotel, New Orleans, La.

SOUTHERN TEXTILE EXPOSITION, Miss Bertha Green, Sec'y, Textile Hall Corp., Greenville, C. C.
Oct. 4-8, Eighteenth Southern Textile Exposition, Textile Hall, Greenville, S. C.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS, H. H. Henline, Sec'y, 33 West 39th St., New York 18, N. Y.
Oct. 11-15, Fall General Meeting, Morrison Hotel, Chicago, Ill.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS, C. E. Davies, Sec'y, 29 West 39th St., New York, N. Y.
Oct. 28-29, ASME-AIME Joint Fuels Conference, William Penn Hotel, Pittsburgh, Pa.
Nov. 28-Dec. 3, Annual Meeting, Statler Hotel, New York, N. Y.

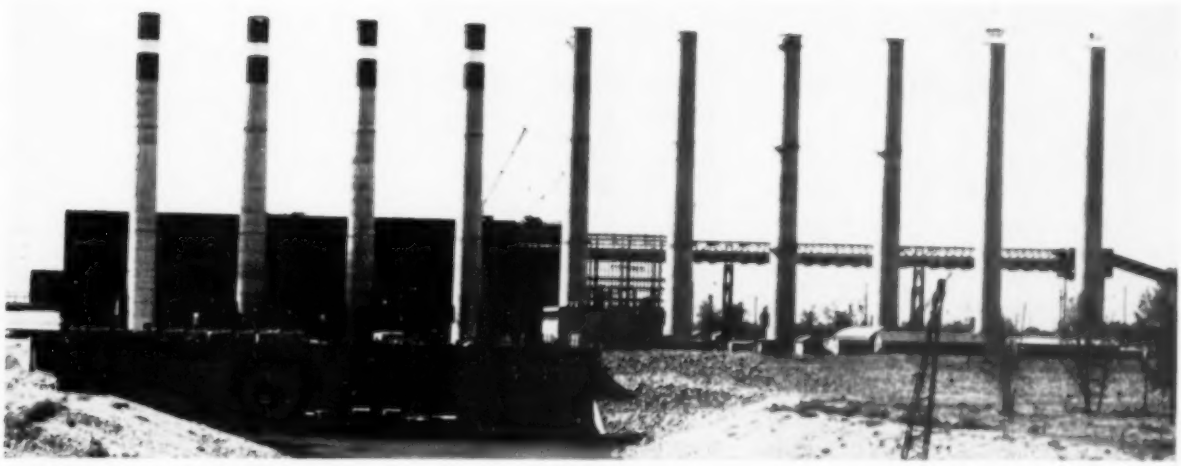
AMERICAN SOCIETY FOR METALS, W. H. Eisenman, Sec'y, 7301 Euclid Ave., Cleveland 3, Ohio.
Nov. 1-15, National Metal Congress and Exposition, International Amphitheater, Chicago, Ill.

AUTOMATIC CONTROL EQUIPMENT SHOW, Strauss, Spigler & Kline, Mgr., Philadelphia, Pa.
Nov. 21-22, First Automation Show, Waldorf-Astoria Hotel, New York, N. Y.

21ST NATIONAL EXPOSITION OF POWER AND MECHANICAL ENGINEERING, Charles F. Roth, Mgr., International Exposition Co., 480 Lexington Ave., New York 17, N. Y.
Dec. 2-7, Power Show, Commercial Museum, Philadelphia, Pa.

More News—page 110

Like All Valuable Property Your Chimney Needs Care

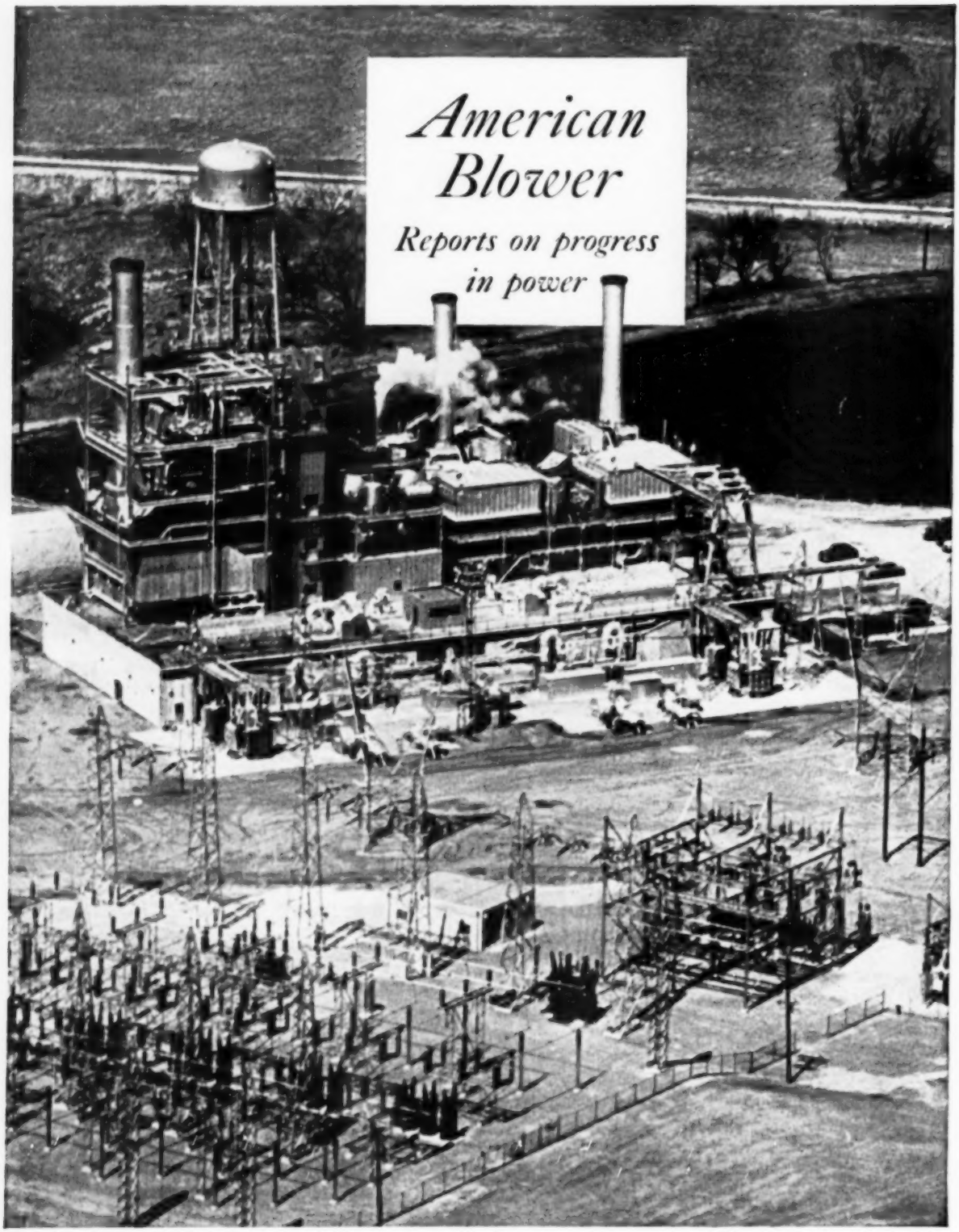


Custodis Construction Company, Inc., built for the Tennessee Valley Authority at the Shawnee Steam Plant near Paducah, Kentucky, ten reinforced concrete chimneys 299' x 14' including foundations with independent linings of perforated radial brick.

ANY job, large or small, receives the careful attention and benefit of Custodis' long experience, sound engineering, expert supervision and skillful workmanship. Custodis excels in this work—a sparkling example is TVA's Shawnee Steam Plant pictured above—and you profit from their more than 50 years of stack experience. Whether your chimney is of brick, steel or concrete, a systematic maintenance plan can be money in the bank for you. Turn to the expert engineers and inspectors of Custodis, skilled in all phases of this highly specialized work. If the chimneys in your plant are cracked or corroded, stop this operating liability with a call to Custodis.

CUSTODIS CONSTRUCTION COMPANY, INC.

- ATLANTA
  806 Henry Grady Bldg.
  WA 1183
- NEW YORK
  157 Chambers St.
  DI 9-3944
- CHICAGO
  22 West Monroe St.
  RA 6-3614



Pictured above is the new Southwestern Station of the Public Service Company of Oklahoma, located on the Washita River, 27 miles west of Chickasha, in the heart of southwestern Oklahoma. This new station assures an abundant supply of dependable electric service for homes, farms, offices and factories.

Serving home and industry: AMERICAN-STANDARD • AMERICAN BLOWER • CHURCH SEATS &

New power for Western Oklahoma

American Blower helps the Public Service Company of Oklahoma expand to meet increasing electrical needs

When present expansion plans are complete, the Public Service Company of Oklahoma will have spent $40 to $45 million on three new steam generating units, the second of which went "on the line" March 1954. When completed, the three new units will develop a total of 362,000 H.P., enough to make the Southwestern Station one of the largest steam electric generating plants between the Rocky Mountains and the Mississippi River.

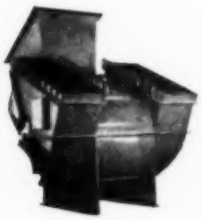
This large investment brings more abundant, low-cost electricity – and a new vitality! – to thousands of homes, farms and factories. Naturally, Public Service Company of Oklahoma, a progressive, investor-owned utility, spends wisely.

Careful search found an ideal location; careful selection assured the finest, most efficient, most economical equipment . . . including American Blower Forced Draft Fans.

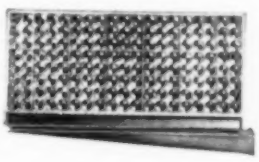
It is significant that Public Service Company of Oklahoma chose American Blower Equipment. Like so many other leading power companies, who use American Blower Mechanical Draft Fans, Heavy-duty Steam Coils, Fly Ash Precipitators and Gyrol Fluid Drives for boiler feed pump and fan control, the Public Service Company of Oklahoma knows it can depend on American Blower equipment.

If you plan to modernize or expand your facilities, contact your nearest American Blower Branch Office, or write us direct.

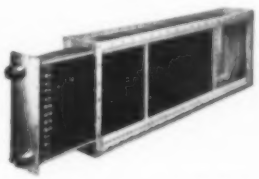
Outdoor installation of American Blower Forced Draft Fan. It is well protected against hail, dust, sand and snow. American Blower Engineers, with their wide experience, can help with your power problems. Give them a call.



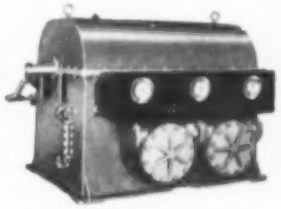
Mechanical Draft Fans for induced and forced draft



Collectors and precipitators for dust and fly ash control



Heavy-duty steam coils for high pressure duty



Gyrol Fluid Drives for boiler feed pump and fan control

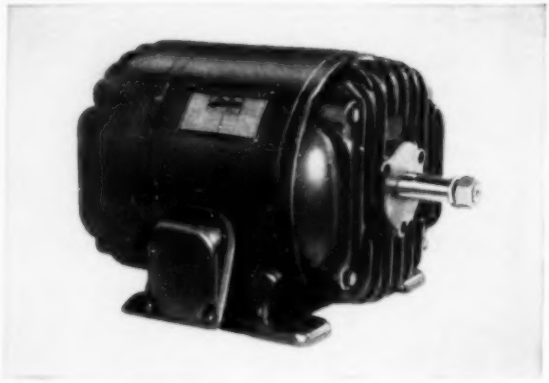
AMERICAN BLOWER CORPORATION, DETROIT 32, MICHIGAN • CANADIAN SIROCCO COMPANY, LTD., WINDSOR, ONTARIO

Division of American Radiator & Standard Sanitary Corporation

AMERICAN BLOWER

WALL TILE • DETROIT CONTROLS • KEWANEE BOILERS • ROSS EXCHANGERS • SUNBEAM AIR CONDITIONERS

Westinghouse Lint-Tight Starter (NEMA Class IA) is sealed by a Neoprene gasket that surrounds the opening and positively shuts out lint. There's no fire danger, no faulty operations, no gummed-up mechanism. The rotary handle, a special type, leaves no troublesome opening in the cover.



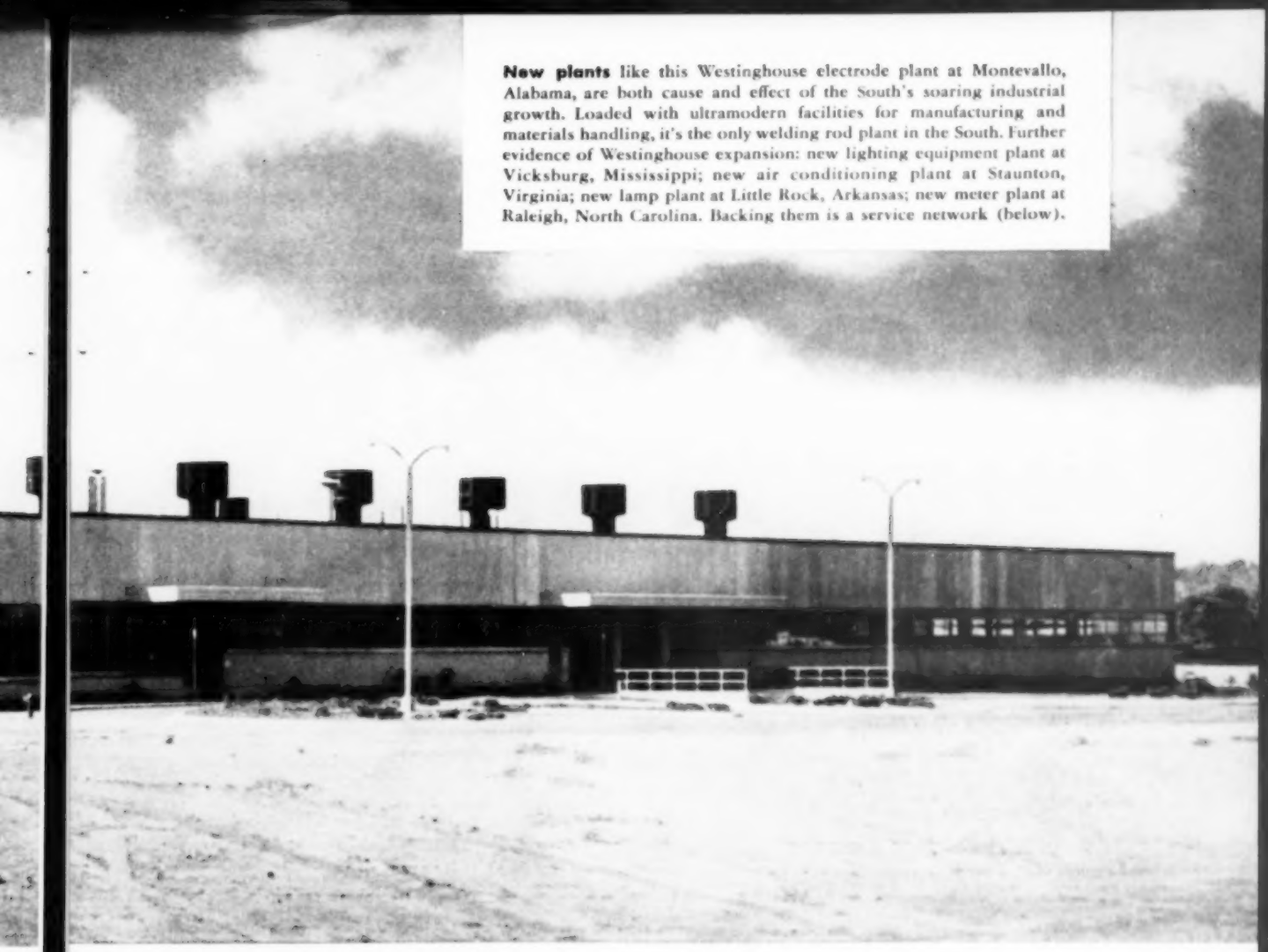
Life-Line® Loom Motors are totally-enclosed, non-ventilated, constant-speed types designed especially for this service. Oversized bearings with locked construction and the use of a special compounded grease assure long motor life. They have ample overload capacity for new looms.

Westinghouse is organized to serve the South

9 Apparatus Repair Shops in Atlanta, Baltimore, Baton Rouge, Birmingham, Charlotte, Fairmont, Fort Worth, Houston, Huntington.

13 Engineering Service Offices in Atlanta, Baltimore, Beaumont, Charlotte, Dallas, El Paso, Houston, Huntington, Louisville, Memphis, New Orleans, Norfolk, Richmond.

8 Renewal Parts Warehouses in Atlanta, Charlotte, Dallas, El Paso, Fairmont, Houston, Huntington, New Orleans.



New plants like this Westinghouse electrode plant at Montevallo, Alabama, are both cause and effect of the South's soaring industrial growth. Loaded with ultramodern facilities for manufacturing and materials handling, it's the only welding rod plant in the South. Further evidence of Westinghouse expansion: new lighting equipment plant at Vicksburg, Mississippi; new air conditioning plant at Staunton, Virginia; new lamp plant at Little Rock, Arkansas; new meter plant at Raleigh, North Carolina. Backing them is a service network (below).

Westinghouse builds 5 new plants for new products in South

A great deal of Southern power is generated in equipment built by Westinghouse. Simultaneously, first-rate Westinghouse equipment helps Southern industry *use* this power efficiently. We're proud that an increasing amount of our apparatus is produced in the South. We're happy to help push upward the spirals of power consumption and industrial output.

Boosting the trend toward new processes—in the chemical, textile and paper industries, for example—are two factors: new electrical equipment and advanced engineering ideas. Westinghouse supplies both. Our own manufacturing plants offer evidence of what we can do for you.

New Westinghouse products cut man power needs. They not only contribute to increased automatic operation, but also wipe out maintenance hours. The two products pictured here are sturdy samples. Ask your nearby Westinghouse representative about them—or about any electrical product, problem or process. Behind him is a team of industry engineers, research engineers, and product specialists who help him make one, all-inclusive recommendation. Westinghouse Electric Corporation, 3 Gateway Center, P. O. Box 868, Pittsburgh 30, Pennsylvania J-96026

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STEAM TURBINES . . . FURNACES BOILERS, STOKERS, BURNERS

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21 **DUST COLLECTORS, STACKS**—Catalog 110—Describes the efficient combination of fans, breeching, stack and dust collector, in three main types to cover all service conditions, well proven in widespread use.—PRAT-DANIEL CORP.

25 **DOUBLE-PASS BOILERS** — Bulletin 153—Gives complete specifications of a new double pass all-purpose industrial and heating boiler, "Southern made for Southern trade." Sizes from 44 to 153 hp S.B.I. with pressure up to 150 lb, designed for coal, gas or oil firing. This is a complete package double-pass unit, recently added to a regular line of single-pass firebox boilers manufactured since 1918.—LUCEY BOILER & MANUFACTURING CORP.

27 **MULTI-STAGE STEAM TURBINES** —Catalog 4200-A, 24 pages—Describes DeLaval mechanical drive multi-stage steam turbines up to 20,000 hp, and turbine generators up to 11,500 kw.—Lists basic types available, governor diagrams, design features, use of byproduct power.—DeLAVAL STEAM TURBINE CO.

32 **ROTOGRATE STOKER**—New Bulletin—Describes an advanced design of spreader stoker with forward moving grates for large and medium boilers. Successfully burns an extremely wide range of fuels, including screenings or coarse run of mine coal without grinding or pulverizing. —DETROIT STOKER CO.

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37 **STEAM BOILERS**—Bulletin SB-50, 16 pages—Describes and illustrates complete line of steam generating equipment, with sectional views, diagrams, plant applications. Condensed reference material for consulting and power engineers.—ERIE CITY IRON WORKS.

44 **CHIMNEYS — INDUSTRIAL AND INSTITUTIONAL**—Brochure—Outlines services available for the construction, design and maintenance of all types of industrial and institutional chimneys.—INTERNATIONAL CHIMNEY CORP.

46 **AIR PREHEATERS**—Bulletin "The Ljungstrom Air Preheater," 36 pages—Explains fuel savings and increased performance possible by using waste heat in flue gases to preheat incoming combustion air. Explains operation, construction and economy of gas-to-gas preheaters of the continuous regenerative type.—THE AIR PREHEATER CORP.

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FANS—PUMPS—COMPRESSORS HEATERS—HEAT EXCHANGERS

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166 **CONCENTRATORS** — Bulletin 119 and Bulletin 118—Describe the new "No Frost" concentrators, with applicational and equipment illustrations and a comparative chart which shows the development of methods.—NIAGARA BLOWER CO.

176 **HEATER MAINTENANCE**—Bulletin IH-9 and Check Chart—Gives points to be checked in unit heater maintenance. Installation and maintenance procedures for Wing industrial heaters.—L. J. WING MFG. CO.

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856 885 906 956 969 T-1 T-2 T-3 T-4 T-5 T-6 T-7 T-8 T-9 T-10 T-11 T-12 T-13 T-14
T-15 T-16 T-17 T-18 T-19 T-20 T-21 T-22

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H-1 H-2 H-3 H-4 H-5 H-6 H-7 H-8 H-9 H-10 H-11 H-12 H-13 H-14 H-15 H-16
H-17 H-18

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and illustrations of a special laundry lift electric hoist.—AMERICAN MONORAIL CO.

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786 **BOILER WATER CONTROL VALVES**—Bulletin 208-C, 4 pages—Describes the Camomatic valve for use in controlling feedwater in industrial, utility and service plants. Illustrates and explains applications for automatic water softening, pressure filtering, and other chemical process cycling control.—BELCO INDUSTRIAL EQUIPMENT DIVISION, INC.

787 **ZEOLITE SOFTENERS** — Bulletin WC-103 — Describes zeolite water softeners of the sodium cycle and hydrogen cycle—softening water by ion-exchange—featuring modern design, economical operation, successful performance, and excellent service.—GRAVER WATER CONDITIONING CO.

ELECTRICAL

823 **PRESSURE SWITCHES** — Catalog 49B—Describes complete line of pressure switches for use on air compressors, water systems and the like. Wide range of pressure settings and variety of enclosures.—FURNAS ELECTRIC CO.

830 **MANUAL MOTOR STARTER**—Bulletin 609 — Describes a manual starter available in enclosures for general, waterproof, dust tight and hazardous locations—very quick-make and quick-break silver alloy contacts and double overload breakers.—ALLEN-BRADLEY CO.

845 **CERAMIC CAPACITORS** — Bulletins 607 and 608-A—Describe precision ceramic capacitors hermetically sealed in metal tubes, to greatly extend the capacitance range available to circuit designers, at rated voltages of 500, 1000 and 1500 volts d-c-. This construction was pioneered originally by Sprague-Herieck, the Herieck Corporation being a wholly-owned subsidiary of Sprague.—SPRAGUE ELECTRIC COMPANY.

851 **"FUSEOLOGY"** — Handbook on Fuses—Intended to help maintenance engineers. Tells what to do when fuses blow, where to look for trouble—what to do after trouble is found—how to select the right type for various circuits—how to choose the proper size of fuse or Fusetron.—BUSSMANN MFG. CO.

854 **ADEQUATE WIRING** — Booklet "Wire Ahead"—Discusses preventive maintenance in electrical systems—the symptoms of inadequate wiring—and plans for anticipating electrical demands.—ANACONDA WIRE & CABLE COMPANY.

856 **ELECTRONIC COMPONENTS** — Catalog R-200, 36 pages—Describes I-T-E sub-miniature resistors, precision and power resistors, camera-and-receiver-type deflection yokes, focus coils, and IF and RF transformers and coils. Charts, tables drawings, as well as selection and application information.—I-T-E CIRCUIT BREAKER CO.

885 **TELEPHONE CABLE** — Catalog W-51-2, 16 pages illustrated—Covers the development of Laytex insulation for telephone cables. Gives construction, tests and full specifications for all Laytex insulated conductors.—UNITED STATES RUBBER COMPANY.

MISCELLANEOUS . . . SAFETY, BUILDING EQUIPMENT, METALS

906 **INDUSTRIAL DUST COLLECTOR**—Catalog 101 — Describes the Aerotec industrial dust collector, available in self-contained, custom-built industrial assemblies which may be adapted as integral parts of existing equipment, with tube performance records given on eight representative dusts.—THERMIX ENGINEERING CO.

956 **SWIMMING POOL EQUIPMENT**—Bulletin WC-109—Describes a complete line of swimming pool equipment, including filters, chemical feeders, sterilizers, hair and lint catchers, pool cleaners, recirculating pumps, heaters, fittings and accessories—dimension, capacity and other tables.—GRAVER WATER CONDITIONING COMPANY.

969 **INSULATING BRICK** — Brochure IN-115A—Describes the construction, application and use of insulating firebrick, including insulating brick, hydraulic-setting refractories, aggregates and fills—for service temperatures up to 3000 F.—JOHNS-MANVILLE CORP.

Continued on page 108

8-54-2

Please send me without obligation, free booklets described in the August, 1954, issue of SOUTHERN POWER AND INDUSTRY as circled below.

18 21 25 27 32 33 37 44 46 65 66 68 89 106 117 124 150
164 166 176 193 207 229 242 261 287 293 304 309 311 340 345 360 366
383 397 405 424 463 476 481 483 491 508 516 517 548 551 555 576 601
606 609 611 623 637 695 736 775 778 780 786 787 823 830 845 851 854
856 885 906 956 969 T-1 T-2 T-3 T-4 T-5 T-6 T-7 T-8 T-9 T-10 T-11 T-12 T-13 T-14
T-15 T-16 T-17 T-18 T-19 T-20 T-21 T-22

Also send further information on following New Equipment (page 100)

H-1 H-2 H-3 H-4 H-5 H-6 H-7 H-8 H-9 H-10 H-11 H-12 H-13 H-14 H-15 H-16
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List Items You Want, Tear Out and Mail One of the Attached Cards Now!

Please be sure to fill in your Firm's Name and your position on the Coupon. This service cannot be extended to you unless this information is furnished.

Sure, that old pump still works,

but how much does it cost to keep?

That rugged old pump of yours may not be the bargain that it seems. Let's do some arithmetic. If the efficiency of the old pump is 75% vs. the 85% efficiency of the new pump, you are paying more to keep it than you would to replace it. That's because a new unit of equivalent output uses less power. Thus it soon saves its own cost — then begins to pay dividends.

Let's take a specific example — a small boiler feed pump

Old pump efficiency 63%	**99.5 BHP**
New pump efficiency 69%	**91.0 BHP**
	8.5 BHP Saving

On the basis of 1¢ per KWH, the 8.5 BHP saving for 8,760 hours (a year of continuous operation) amounts to $560. This saving, capitalized in 10 years at 4%, adds up to $6,700. Yet the price of the new pump that saves $6,700 is only $1,101.

What would the pump replacement profit be in your particular case? Your De Laval representative can tell you exactly — in dollars and cents — as soon as he has the basic facts on your present installation. Call him in today or write to De Laval for Pump Fax Bulletin which includes a valuable "power-savings" chart.

DE LAVAL *Pumps*

DE LAVAL STEAM TURBINE COMPANY
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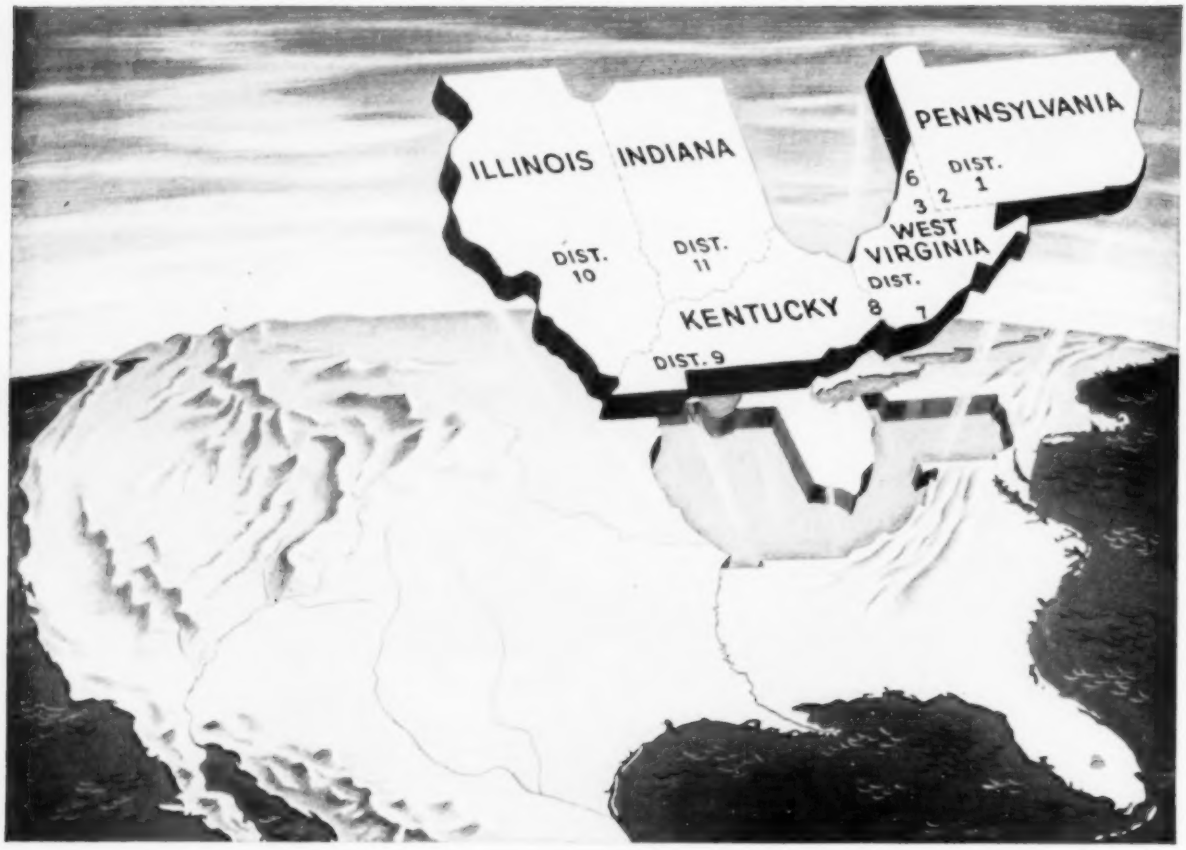

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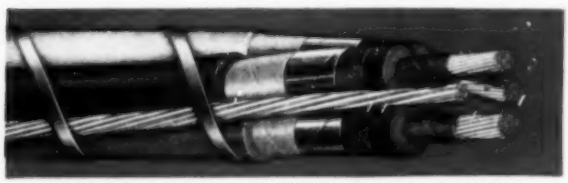
Ordinary rubber can't handle OZONE

You need U. S. GRIZZLY Uskorona-insulated Power Cables

Here's an illustration showing how ozone can chew up a sturdy, rugged cable. This can never happen with United States Rubber Company's famous Grizzly® Power Cables insulated with Uskorona® compound which prevents electrical failure caused by ozone (Uskorona-1 oil base compound or Uskorona-2 butyl rubber compound). Uskorona meets (and in many ways exceeds) the applicable IPCEA specifications for ozone-resistant rubber insulation.

As the only wire manufacturer that grows its own natural rubber, produces its own synthetics and makes its own plastics (as well as the bulk of its own rubber-compounding chemicals and ingredients), United States Rubber Company is able to make certain that only the finest materials are used in the insulations for its wires and cables. These materials are expertly compounded according to methods devised after years of research and experimentation in "U.S." laboratories. Finally, U.S. Rubber's practical "know-how" contributes its important part to the uniform high quality of every "U.S." insulation. This "know-how" is the result of 68 years of successful manufacture of electrical wires and cables, and over a century in the making of fine rubber products.



U. S. Grizzly Uskorona-insulated Power Cable, 5,000 Volts, type RR 3 conductor, shielded, Neoprene jacket.

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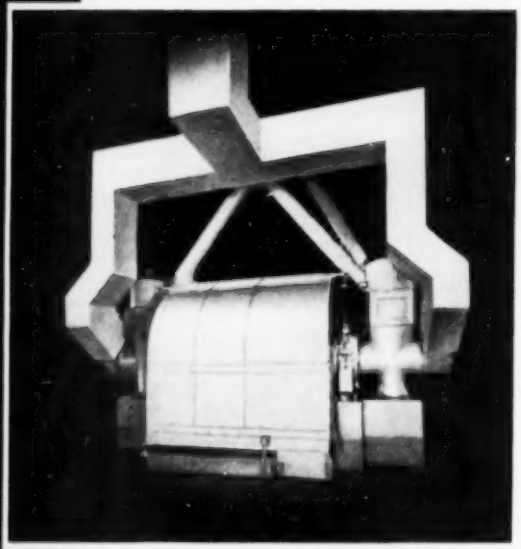
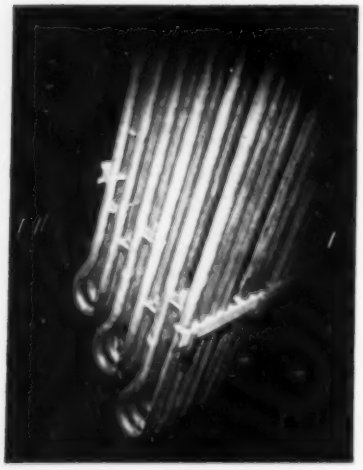
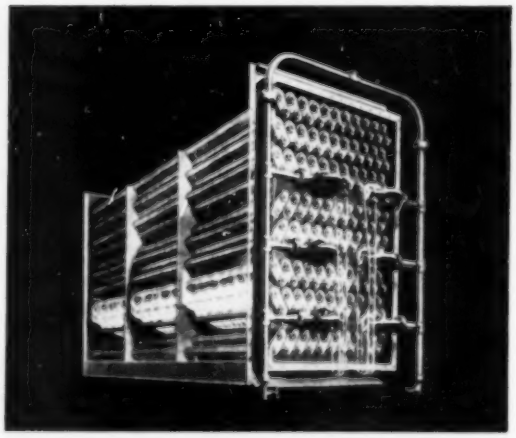


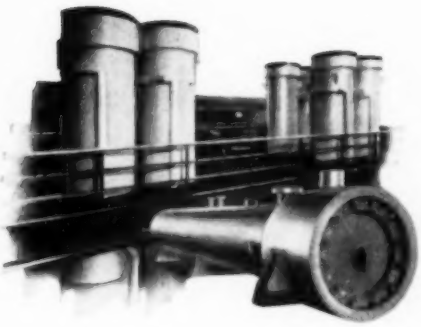
BALL MILL PULVERIZERS which grind hard, abrasive fuels to a constant fineness. Operating records show low maintenance, high availability of 99% or better.



SUPERHEATERS of the convection and radiant type, either singly or in combination. Superheat control over a wide load range is also offered as a means of positive and accurate control of final temperature.

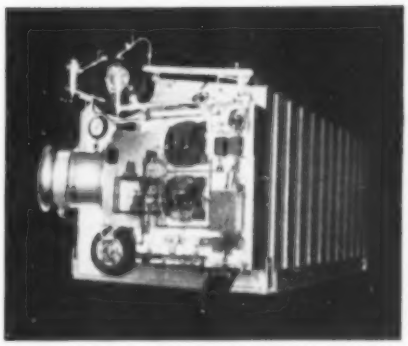
ECONOMIZERS of the cast-iron, extended-surface steel-tube type which are corrosion-resistant, impervious to soot fires, easily cleaned, and of unique, simple design. Bare tube construction also available.





PACKAGE STEAM GENERATORS in capacities of 10,000 to 30,000 lb. of steam per hr. Water-tube type, plant assembled, shipped ready to install. Design pressures of 250, 525, 825 psig provide operating pressures from 100 to 800 psig.

FEEDWATER HEATERS of the shell-and-tube type, as well as direct contact arrangements, are available. "Lockhead" closures have been built for pressures up to 3500 psi.



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Only Foster Wheeler offers such a broad line of steam plant equipment engineered for increased efficiency through modernization.

IN OVER 50 YEARS of service to the power industry, Foster Wheeler has pioneered the development of steam generators, fuel systems, condensers and cooling systems of the highest efficiency. Continuous research and engineering have created a background of technical experience, *as well as* an integrated line of equipment in which each individual product is designed to contribute to the efficiency of all.

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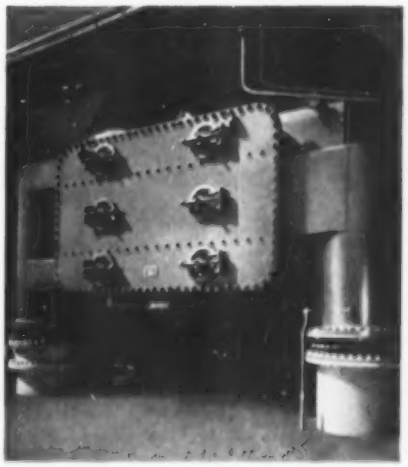
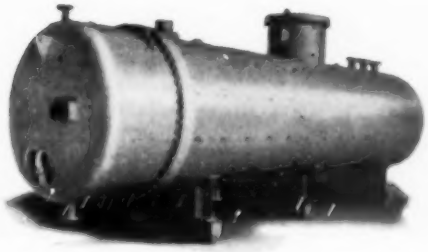


CONDENSERS to meet any conditions of headroom at any location. Our shops are fully equipped to supply units of 100,000 sq. ft. and larger.

EVAPORATORS for boiler feed make-up and of heat-transformer types in all sizes. Special types to handle raw and treated make-up to give the best thermal and descaling operation as well as producing pure vapor.



COOLING TOWERS custom-engineered to meet your requirements for greatest economy. Mechanical draft, counter-flow type. Provide minimum spray loss, flexibility to meet all weather conditions.

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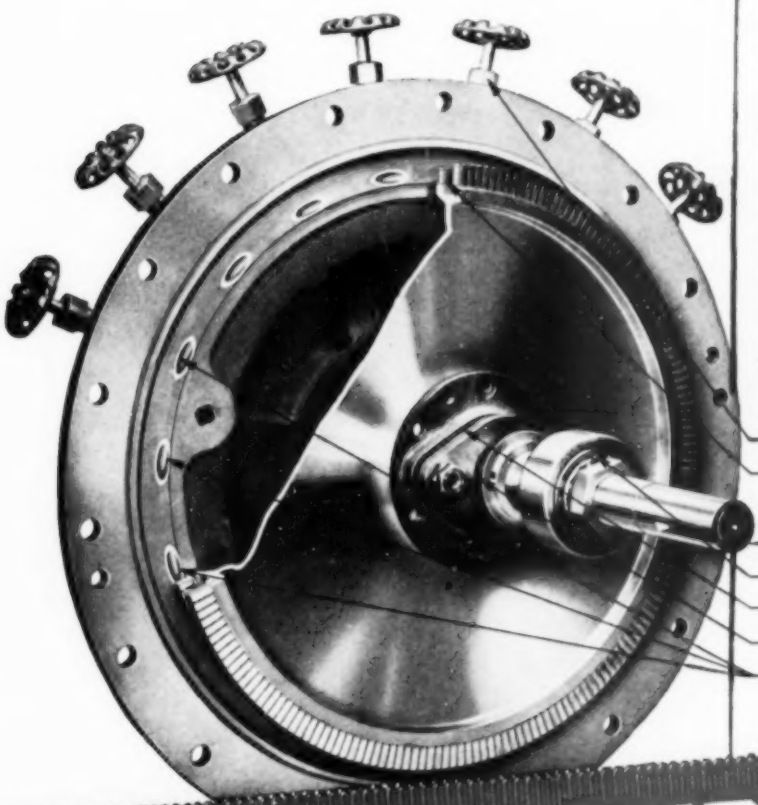
No other steam turbine offers you

SUCH VERSATILE STEAM NOZZLE CONTROL

The larger number of hand valves you see on a Coppus Steam Turbine promises you greater operating economy. At least 60% of the steam nozzles can be individually controlled to give maximum steam pressure in steam chest . . . a guarantee of best water rates at any load. Maintenance economy, too, is assured by the hard chromium plating of the shaft at the stuffing box. It provides the best possible smooth, non-corrosive surface for packing rings.



- 7 hand valves for efficient partial load operation, (20" turbine shown)
- 2 row velocity-stage turbine wheel with stainless steel turbine buckets — statically and dynamically balanced
- 30-40 carbon steel shaft
- Oversized double row deep grooved ball bearing
- Stuffing box with metallic packing ring
- Heavy chrome plating of shaft through stuffing box
- 3 nozzles always open

Coppus Steam Turbines, Type TF, driving chemical transfer pumps at Celanese Corporation of America's Chemcel Plant

Coppus Steam Turbines ranging from 150 hp down to fractional in 6 frame sizes

MAKE TURBINE DOLLARS GO FARTHER

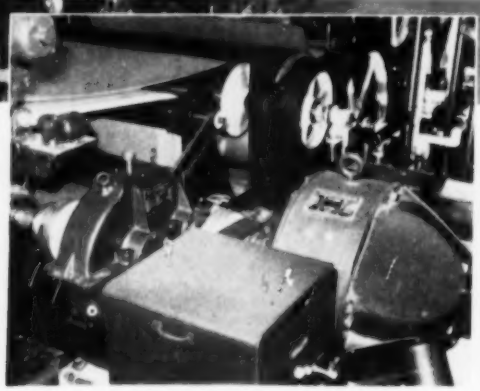
Why waste money buying turbines with higher horsepower ratings than you need? The higher the horsepower rating, the higher the price. Save money by selecting the Coppus Turbine size closest to your requirements from 150 hp down to fractional. And when you do, you save operating and maintenance costs, too. That's what these other Coppus features are designed to do: exclusive pilot operated excess speed safety trip supplementing constant speed governor; choice of metallic or carbon ring packing assemblies. Designs available for back pressures up to 75 pounds; replaceable cartridge type bearing housings. For full details . . .

WRITE FOR BULLETIN 135

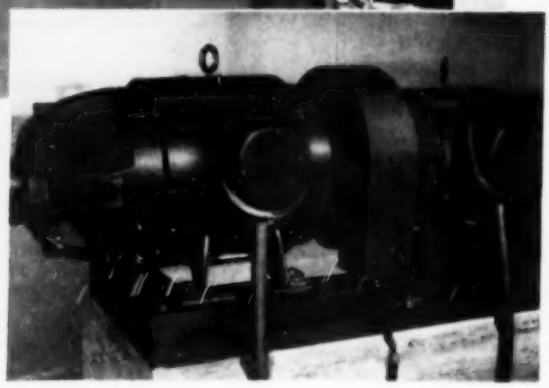
COPPUS ENGINEERING CORP., 248 Park Avenue, Worcester 2, Mass. Sales offices in THOMAS' REGISTER.

COPPUS "BLUE RIBBON" TURBINES

Magamp control used with differential regulator maintains the proper speed on each section under practically all conditions. It does this regardless of changes in load, variations in vacuum, changes in nip pressure and doctor blade pressures.



D-c motor coupled to reduction gear unit—here's a typical section driving unit. Totally-enclosed and force-ventilated, the unit is, in turn, coupled to the paper machine's press section.



Master frequency m-g set supplies an adjustable frequency reference to the individual section speed regulators for securing any operating speed. Flywheel compensates for inertia differences.

Westinghouse drives with Magamp boosted our paper production

Paper machines vary in size, type and number of sections, operating speed range, width of sheet and type of paper produced. In every case, the drive must be engineered to meet these variable factors. After asking you, the papermaker, what you needed most in a drive, Westinghouse modernized its sectional motor drive to give you minimum down time, peak production, and less maintenance.

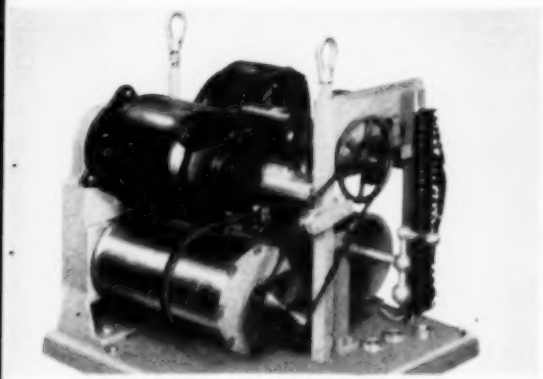
Westinghouse Magamp (Magnetic Amplifier) regulator—a unit that precisely controls section speeds and draws—permits high operating speeds without paper breaks. It's a static device with no tubes and no moving parts other than the cone pulleys and reference motor. Magamp is more rugged, reliable, and requires less maintenance than any other type of regulator now on the market. Elimination of line shafting, with its associated belts, pulleys and clutches, is a safety factor and a space saver. Magamp regulated drive cuts outage time and operating costs. Initial base adjustments, once made, remain unchanged during the equipment's life.

Every Westinghouse paper machine drive is an engineered application. Each unit of apparatus is selected to meet job requirements and specific mill conditions. The heavy, rolled steel frame of the Type SK d-c motor, with uniform magnetic qualities, makes it possible to duplicate speed characteristics accurately. Form-wound armature coils, cast brass brushholders, separate field coil units, deep commutator segments, and either sleeve or antifriction bearings provide maximum life and dependability.

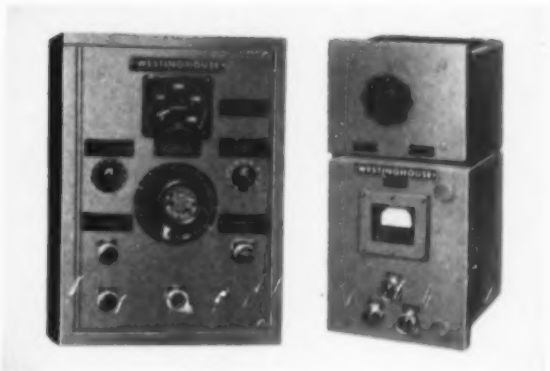
Gear units and gearmotors are designed and built by Westinghouse to give you dependable and economical power transmission. Motor speeds are reduced to the roll speeds of each driven section by efficient, single helical gears and tapered roller or ball bearings. The exclusive Westinghouse B. P. T. taper-hardened process is used on all gears and pinions. Horizontal split-case construction makes all parts easily accessible for quick, simple inspection without disconnecting couplings, draining the oil, or dismantling the drive.

MP-5039

YOU CAN BE SURE... IF IT'S Westinghouse



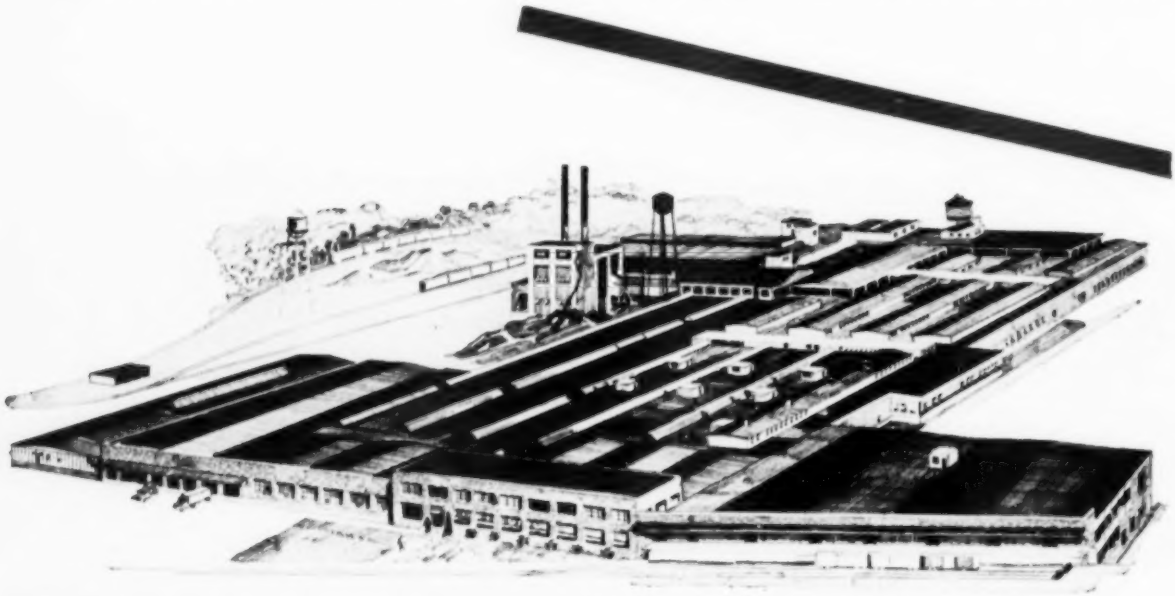
Error detecting unit compares the individual section speed with the master set frequency. Any difference is transmitted to the Magamp regulator which brings the section speed in step.



Operator's master control station (left) shows speed indicator and provides for automatic control of machine functions. An individual operator's station (right) has a meter to show load.

one WICKES

generates steam in new B. F. GOODRICH



At the Oaks, Pennsylvania, tire and tube plant of The B. F. Goodrich Company, part of a $9,000,000 expansion program now in progress includes modernization of the plant's power facilities. A new WICKES 2-Drum Steam Generator (shown in the blueprint) will help supply the steam necessary in the production of the 3,500,000 tires per year at this new plant. The unit will produce 115,000 lbs. of steam per hour at 300 lbs. pressure. It is equipped with an air heater and super heater. Like so many other industries and institutions that depend on steam for heat and power, B. F. Goodrich knows that WICKES Boilers are a reliable source of low-cost steam. WICKES will design and build water tube steam generators for any practical size and pressure. WICKES also offers a wide choice of auxiliary equipment so that you get not only the best steam generator, but also the best correlated equipment. Consult your nearest WICKES representative or write us today.

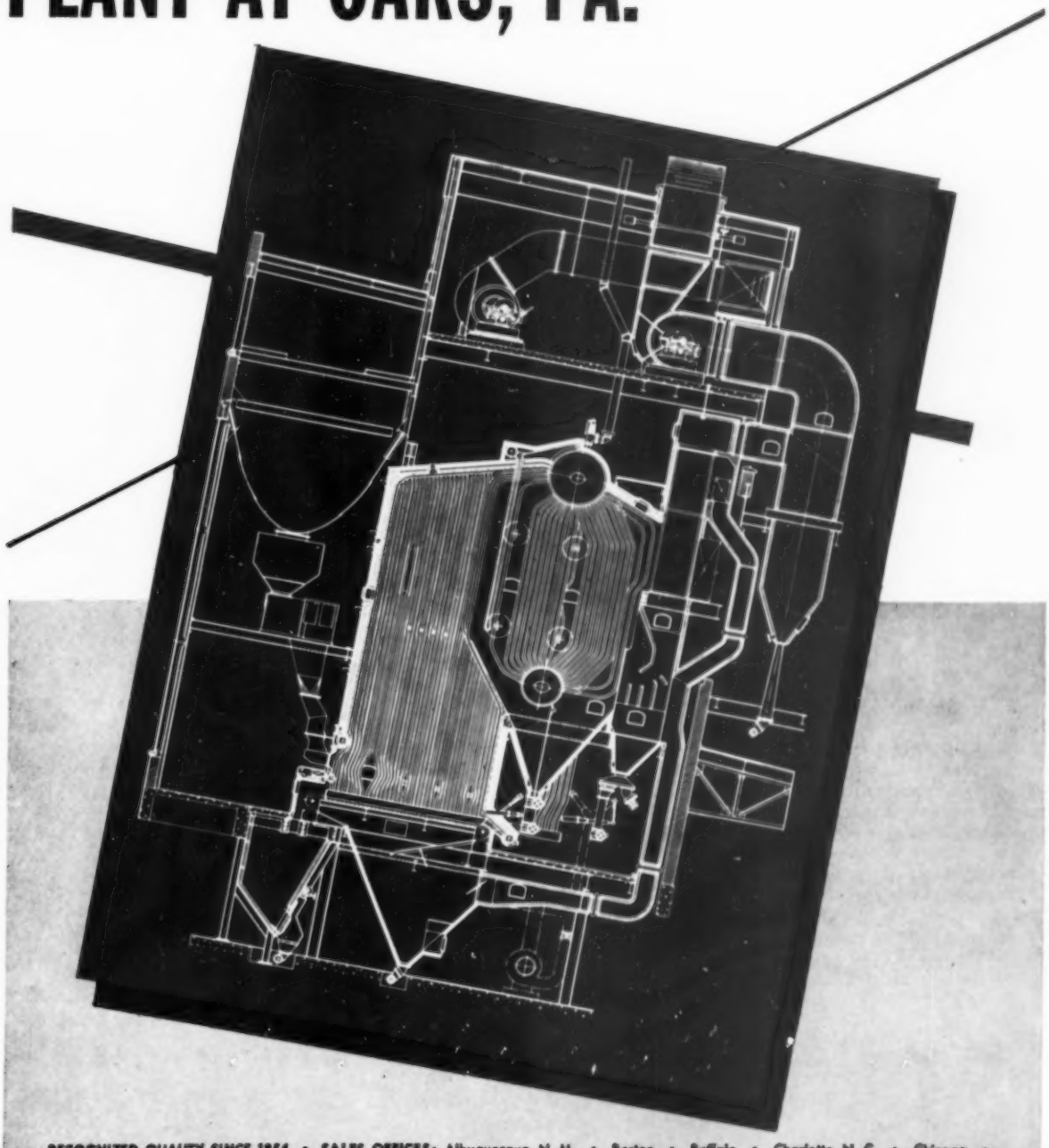
OUR 100th YEAR

THE WICKES BOILER CO.

DIVISION OF THE WICKES CORPORATION • SAGINAW, MICHIGAN

two drum boiler

PLANT AT OAKS, PA.



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156

3¢ just saved me 900 dollars

THAT's what I said—3 cents. The cost of a postage stamp — the stamp I used to mail an inquiry to National Tube.

You see, we just put an addition on the plant. It was my job to specify the pipe and tubing. I had decided to buy NATIONAL Seamless because we'd already used it with great success for boiler-feed lines as well as main steam piping.

However, the higher temperatures and pressures we planned to use made me a little apprehensive as to the analysis I should select. After a good deal of thought, I chose a high alloy steel in a heavy-weight seamless grade. I prefer to keep on the heavy side of weight tolerances rather than on the light side. It's safer.

Before I turned in my recommendation for the analysis, though, I decided to ask National Tube about it—just to be sure. That's when I stuck that lucky 3-cent stamp on the envelope and sent it to National's district office.

A National engineer came out, looked the plant over, did a little figuring, and handed me the *correct* analysis.

The pipe and tubes I had specified were good—but just a little *too* good for the job. When the costs were figured, the material recommended by National Tube was 900 dollars *less* than the type I had selected. And the advice hadn't cost me a cent.

Let me tell you—National Tube helps make sure you get the *right* pipe or tube for the job, everytime. And at the least cost to you. So why take chances?

WELDS WITHOUT WELDS

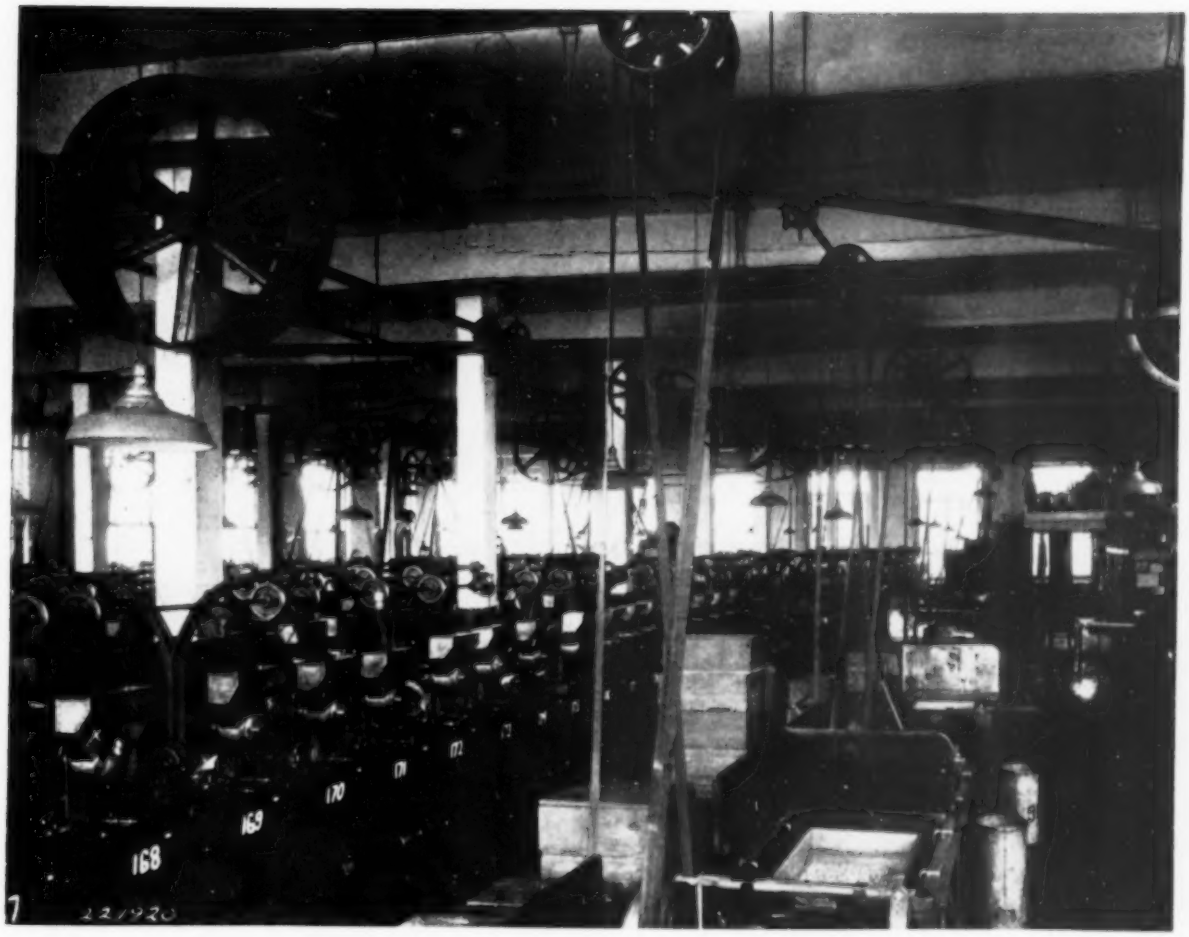
NATIONAL TUBE DIVISION, UNITED STATES STEEL CORPORATION, PITTSBURGH, PA.
(Tubing Specialties)

COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

U·S·S NATIONAL *Seamless* PIPE AND TUBES

USS

UNITED STATES STEEL



A Cut Above The Average

THE *right* cutting oil for the job gives cutting tools longer life, reduces rejects; produces cleaner cuts and finer finishes. Throughout the South, producers of machine tools and precision instruments have learned from experience that they can depend on Standard Oil Cutting Oils to help them secure improved finish, closer tolerances; and to cushion against shock and protect tools from wear in cutting, drilling, reaming and tapping. Because of their great cooling effect, they make high speeds possible. There is a Standard Oil lubrication engineer in your area. His accumulated experience on lubrication in your field will be helpful. His services cost you nothing—they may save you much.

Standard Oil Company
(KENTUCKY)

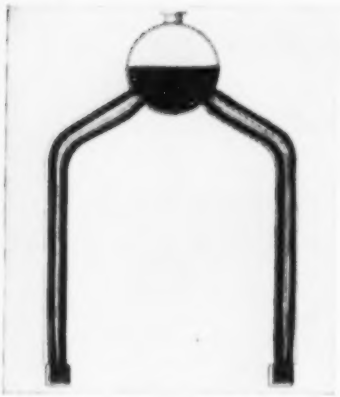
STANDARD OIL
LUBRICANTS

AN *Exclusive* ERIE CITY DESIGN

The VL with EXCLUSIVE features guarantees a minimum of furnace maintenance and insures a positive supply of clean water to the water walls. These EXCLUSIVE features are the result of many years of experience in building two drum boilers; thousands of which are operating in the field today, giving users the satisfactory service they demand.

We Pay Royalties to No One for These Designs

COMPARE THESE *Exclusive* FEATURES

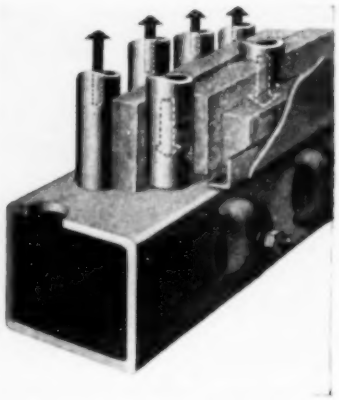


RING-FLOW CIRCULATION IN EACH WATER WALL ELEMENT

For each pair of inside steam tubes, there is a water circulating tube which feeds **clean** water from the top drum to bottom water wall headers. Dividing insulation keeps water circulating tubes cool while heat is carried away from refractory by the steam generating tubes, assuring ring-flow circulation in each element.

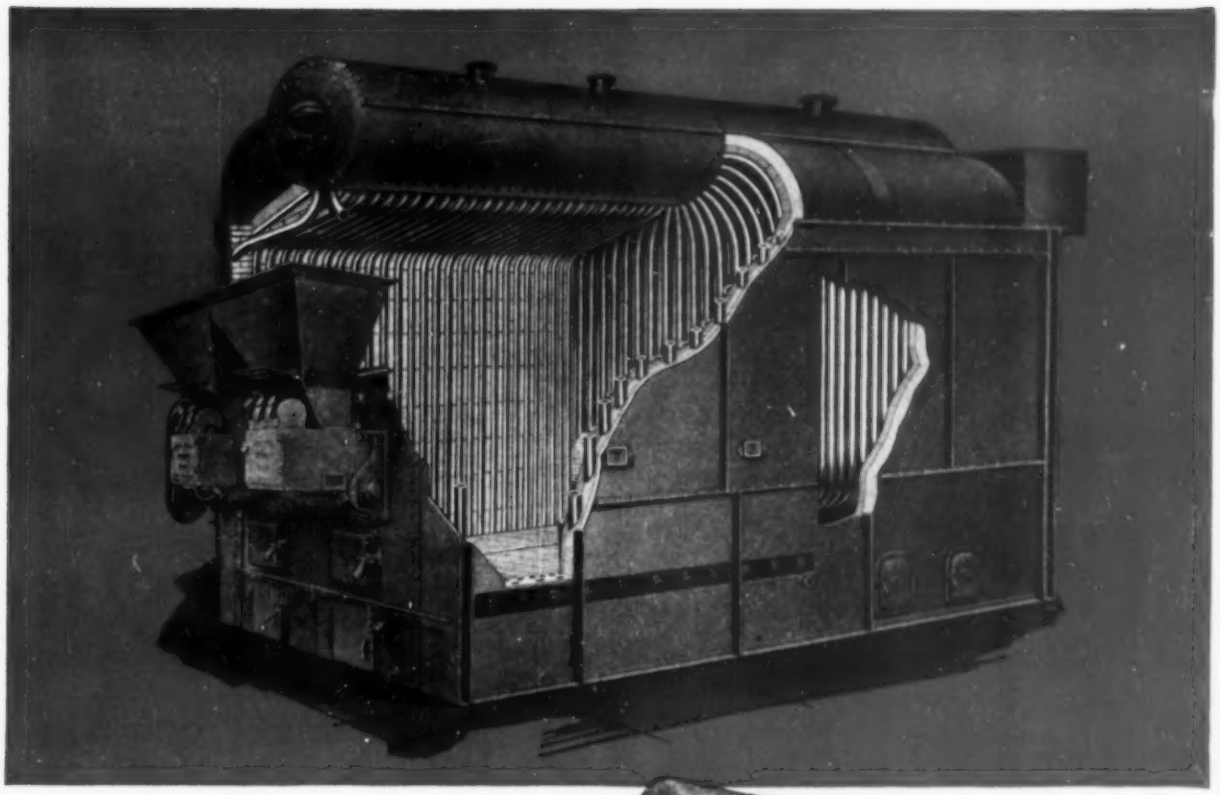
POSITIVE WATER SUPPLY TO WATER WALLS

Normal water level is at the middle of the top drum, but to **assure positive water supply** to bottom headers, under any abnormal conditions, we locate a pair of front feeder tubes at lowest point in the top drum.



WATER WALLS ACCESSIBLE FROM OUTSIDE THE SETTING

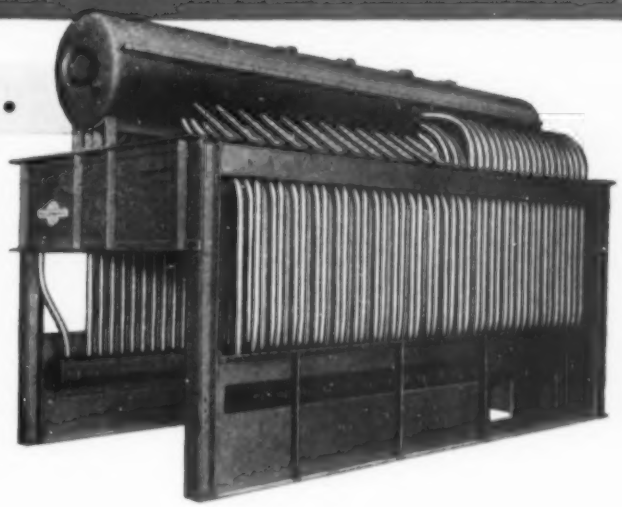
No need to go into the furnace to inspect the water wall headers —VL's are equipped with large handhole openings, **located outside the setting,** for access to any part of the header. No elaborate tools required to remove handhole plates. View above also shows how each downcomer tube supplies a pair of steam or riser tubes in side water wall element.



WITH THE FIELD ....

LOW FURNACE ROOF PROTECTS BOILER TUBES

Furnace tubes entering low on the drum **protect drum shell** and top ends of boiler tubes from radiant heat absorption in the event of water low in the gauge.



The VL's integral water wall design with large water and steam capacity combine to make this steam generator universally accepted for its good performance, low maintenance, and ready adaptability to any firing method. Catalog SB-43 gives a detailed description and dimensional data on the Erie City VL Steam Generator.

ERIE CITY
119 Years in Steam Generation

You can depend on Erie City for sound engineering

ERIE CITY IRON WORKS • *Erie, Pa.*

STEAM GENERATORS • SUPERHEATERS • ECONOMIZERS • AIR PREHEATERS
UNDERFEED AND SPREADER STOKERS • PULVERIZERS

CONTINENTAL EQUIPMENT is designed to cut your costs. Shown is an integral combination traveling tripper and reversing shuttle designed for increased storage capacity with existing facilities. Reduced costs per ton of storage and improved working conditions resulted. Let CONTINENTAL ENGINEERS solve your Conveying, Elevating and Power Transmission problems.

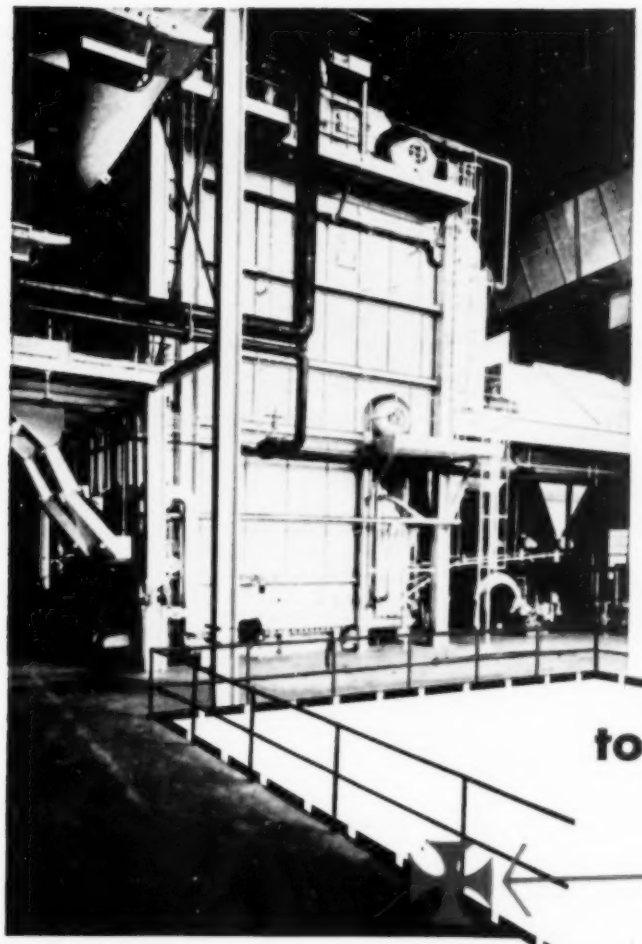
Continental Products

- Belt Conveyors
- Bucket Elevators
- Apron Feeders
- Belt Feeders
- Heavy Manganese Feeders
- Flight Conveyors
- Chain Conveyors
- Screw Conveyors
- Screw Elevators
- V-Belt Drives
- Steel Pulleys
- Gears and Reducers
- Conveyor Belts
- Power Transmission Equipment

CG-5401

INDUSTRIAL DIVISION
CONTINENTAL GIN COMPANY
BIRMINGHAM, ALABAMA

ENGINEERS CGC ATLANTA • DALLAS • MEMPHIS • NEW YORK CGC MANUFACTURERS



another Detroit RotoGrate Stoker for Manitowoc

Wisconsin

to be installed here

Manitowoc Municipal Power Plant

R. E. Cannard, General Manager and Chief Engineer

In 1950 the Public Utilities Commission of the City of Manitowoc installed their first Detroit RotoGrate Stoker with a 175,000 pound per hour Wickes steam generator.

This installation has been so successful that the Utilities Commission has ordered a second Detroit RotoGrate Stoker to fire another Wickes steam generator of 200,000 pound per hour capacity to be installed adjacent to the first unit. Either Ohio or Indiana coal is used.

Detroit RotoGrate Stoker is an advanced design of spreader stoker with grates that move slowly forward continuously discharging ash at the front. Burns a wide range of Bituminous coals or Lignite without special preparation, also hogged wood or bark and other refuse fuels.

Efficiency and burning rates are high with either steady or rapidly fluctuating loads. Parasite power is low. Combustible content of ash is usually less than 2%.

Get complete data on Detroit RotoGrate Stokers. Recommendations and Bulletins supplied without obligation.

DETROIT SINCE 1898 STOKERS

DETROIT STOKER COMPANY

General Motors Building—Detroit 2, Michigan

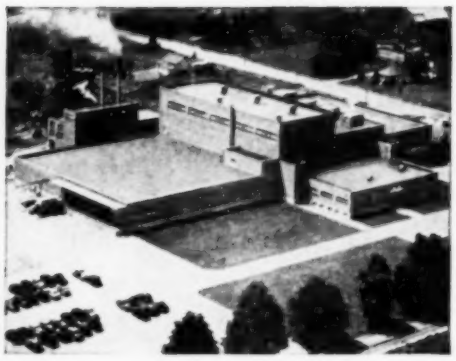
District Offices in Principal Cities • Works at Monroe, Michigan

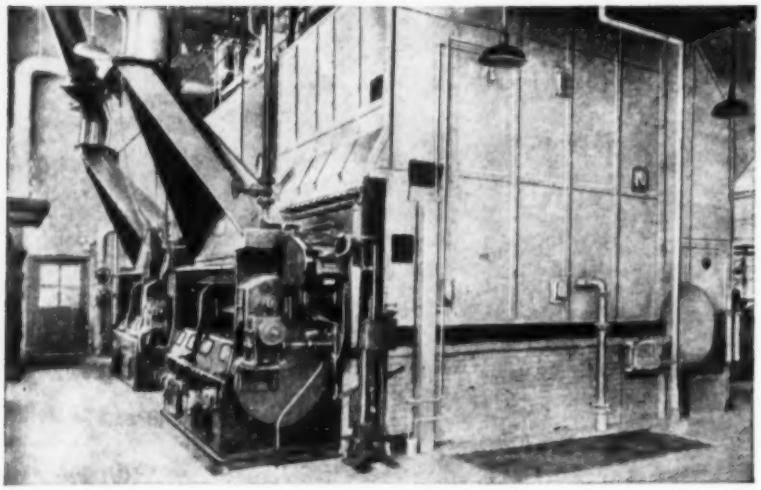
6852

"COAL'S BEST FOR OUR MODERN PLANT!

It's low in cost . . . It's clean and convenient!"

says G. W. Peters, Engineering Manager
M&R DIETETIC LABORATORIES, INC.
makers of PREAM & SIMILAC





"We made a careful study of fuels and burning equipment before building our modern new plant in Sturgis, Michigan. This plant was designed to produce baby food. So the steam plant has to be clean and dust-free as well as economical to operate. Also, we wanted a fuel we could store safely and easily in order to insure ourselves against any shortages.

"We decided on bituminous coal—and the up-to-date installation shown here. It certainly fills the bill on every count. Our modern combustion equipment makes coal far more economical than any other fuel. Up-to-date coal and ash handling give us convenient operation completely free of dust nuisance."

Additional case histories, showing how other types of plants have saved money by burning coal the modern way, are available upon request.

Discover for yourself the great advantages of coal burned the modern way. Call in a consulting engineer. He'll show you how today's combustion equipment can give you 10% to 40% more power from a ton of bituminous coal than from equipment used only a few years ago. He'll show you how modern labor-saving coal and ash-handling equipment make a coal-fired installation clean, convenient, and dust-free.

If you plan to remodel or build a new plant, be sure to look into the low cost and convenience of bituminous coal. Consider coal's other advantages, too. It has reserves that are virtually inexhaustible. America's bituminous coal mining industry is the most efficient and productive in the world. With bituminous coal, you can be sure of plenty of fuel at relatively stable prices now and for years to come.

If you operate a steam plant, you can't afford to ignore these facts!

BITUMINOUS COAL in most places is today's lowest-cost fuel, and coal reserves in America are adequate for *hundreds of years to come.*

COAL production in the U.S.A. is highly mechanized and by far the most efficient in the world.

COAL prices will therefore remain the most stable of all fuels.

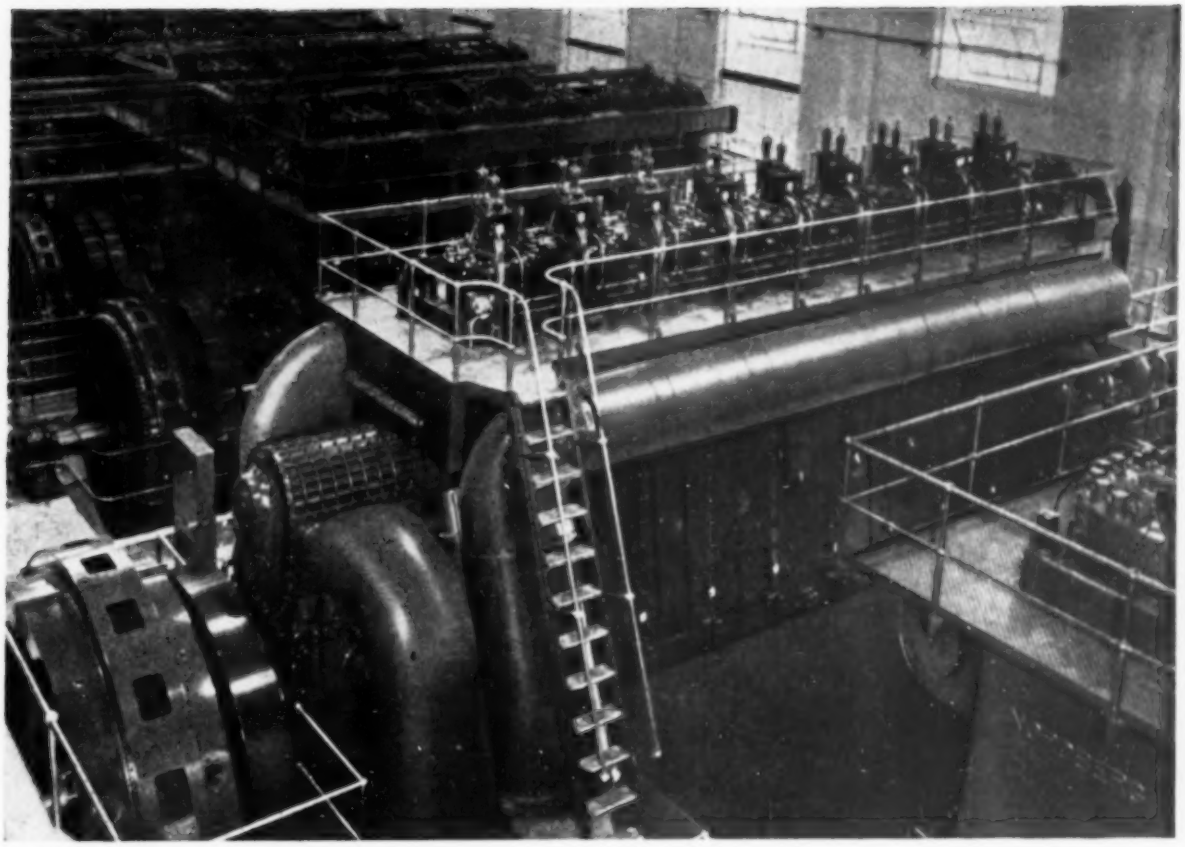
COAL is the safest fuel to store and use.

COAL is the fuel that industry counts on more and more—for with modern combustion and handling equipment, the inherent advantages of well-prepared coal net even bigger savings.

BITUMINOUS COAL INSTITUTE
A Department of National Coal Association
Southern Building, Washington, D. C.

FOR HIGH EFFICIENCY FOR LOW COST

YOU CAN COUNT ON COAL!



Largest Diesel Power Generating Station in the U.S.

reduces cylinder and piston ring wear with SHELL ROTELLA OIL

Electric power for the City of Grand Haven, Michigan, and the surrounding area, is generated by diesel engines in the largest municipal power station of its kind in the U. S. A. Shell Rotella Oil is the cylinder lubricant.

The anti-corrosive action in Shell Rotella Oil combats the major cause of engine wear . . . cylinder and piston ring wear caused by acid action from the by-products of incomplete combustion and condensation.

Tougher lubricating film in Shell Rotella Oil gives cylinders and rings greater protection . . . minimizes wear. Its effective detergent-dispersant action prevents harmful deposits.

Write for technical information. See for yourself how Shell Rotella Oil can help reduce your engine maintenance costs.

SHELL OIL COMPANY
50 WEST 50TH STREET, NEW YORK 20, NEW YORK
100 BUSH STREET, SAN FRANCISCO 6, CALIFORNIA

SHELL

Could You Use SAVINGS *Like These?*

40% less
Fuel Consumption
50% more
Boiler Capacity

Bailey Meters and Controls Insure Savings at Kerr Bleaching & Finishing Works, Concord, N. C.

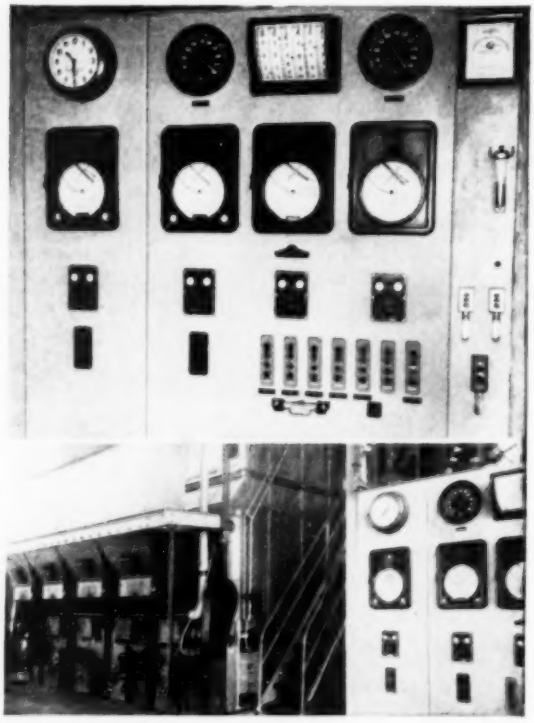
The key to complete returns on any investment in new power equipment is a fully co-ordinated system of meters and controls. It's the old story, the tail that wags the dog—careful attention to this comparatively minor part of the over-all installation cost can mean the difference between profit and loss in operation.

Here's where Kerr Bleaching & Finishing Works has cut operating costs—by installing *co-ordinated* Bailey Meters and Controls. The installation includes Bailey Meter Combustion Control, and Bailey Two-element Feed Water Control.

Such a co-ordinated system is an important plus for Bailey customers. Nowhere else can you buy such a complete range of equipment, selected without bias to do the best job for you. Nowhere else can you find such expert engineering service, immediately available through conveniently located direct sales and service representation. May we help you?

Call our local branch office or write for Bulletin 15-H.

A-113



Control panel, showing completely co-ordinated Bailey Meters and Controls at Kerr Bleaching and Finishing Works, Concord, N. C.

BAILEY METER COMPANY

BAILEY METERS

1028 IVANHOE ROAD, CLEVELAND 15, OHIO

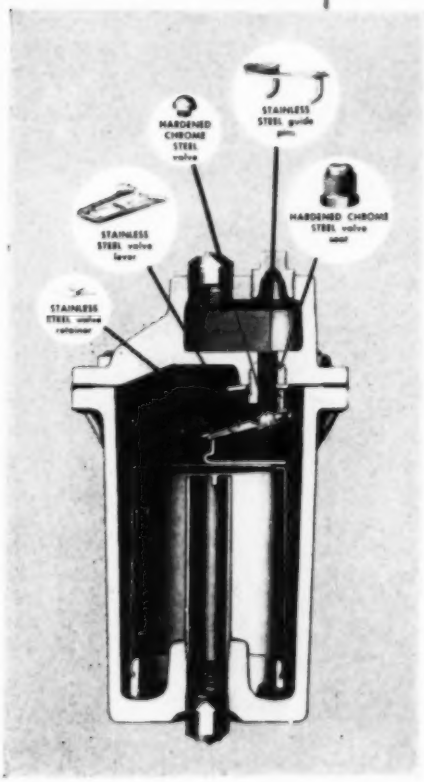
Controls for Steam Plants
COMBUSTION · FEED WATER · TEMPERATURE · PRESSURE · LIQUID LEVEL · FEED PUMPS

You will always get better results by putting a Steam Trap on each Steam Coil, Chest or Unit

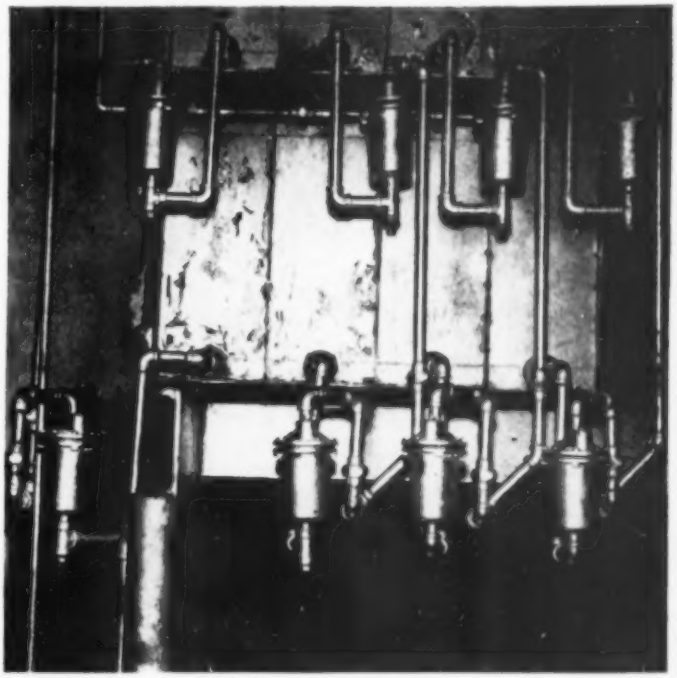
EXAMPLE

Dryer Temperatures at
Guelph Creamery, Guelph, Ontario.

WITH GROUP TRAPPING (5 steam traps for 10 coils)	**225°F**
WITH BLOW-THROUGH (no steam traps)	**250°F**
WITH ARMSTRONG UNIT TRAPPING (10 traps—one on each of 10 coils)	**309°F**


HARDENED CHROME STEEL valve
STAINLESS STEEL guide pin
STAINLESS STEEL valve lever
HARDENED CHROME STEEL valve seat
STAINLESS STEEL valve retainer

One of the big advantages of Armstrong traps is LOW MAINTENANCE. Mechanisms in low and medium pressure traps identical in design, workmanship and materials to those in 900°F, 900 psig traps.



● The example at the upper left is simply one of thousands that bear out the benefits of "Armstrong *Unit* Trapping".

When you analyze it, the reason is quite obvious. No two steam coils, chests, chambers or machines will condense steam at exactly the same rate under operating conditions. There is a greater pressure drop in the units that condense the fastest. Steam will backflow through a common drain line from a higher pressure unit to a lower pressure unit. This blocks off flow of air and retards condensate flow from the lower pressure unit. On the other hand, if you separate each unit with its own trap, that can't happen.

You will *always* get higher temperatures and lower production costs with unit trapping. Ask your Armstrong Representative about it, or write:

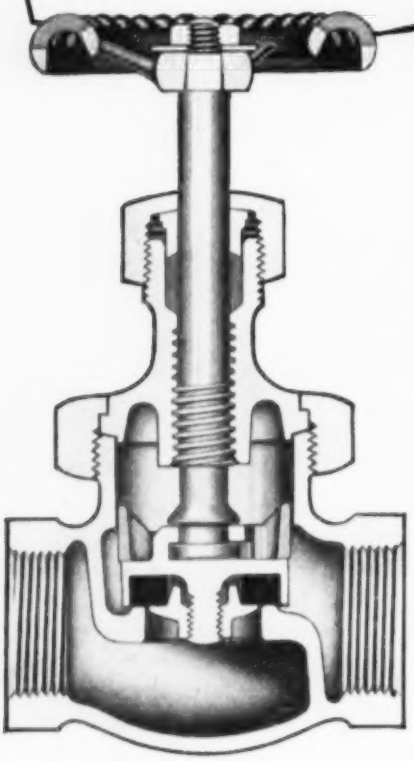
ARMSTRONG MACHINE WORKS
806 Maple Street, Three Rivers, Michigan

FREE—STEAM TRAP BOOK

If you don't have a copy of the 44-page Armstrong Steam Trap Book, we'll be glad to send you one. No obligation.

ARMSTRONG STEAM TRAPS

A New Disc . . .
A "New" Valve



Crane No. 7 Brass Valves with quick-change composition disc

Save time, trouble, and money by standardizing on these Crane quality 150-Pound Valves. Simple to service. No big inventory of replacement parts. Just a few extra disc holders . . . a supply of composition discs. That's all you need for a wide variety of fluids . . . and an economical maintenance program.

The composition disc takes most of the normal wear—stands up well under ordinary usage—seats easily even on air and gas—absorbs foreign particles that might cause leakage in metal disc valves. When a leak shows up, make a "new" valve—with a new disc. Simply dismantle the union ring, lift out the trimmings, replace the disc holder assembly. Takes only a few minutes. Save the disc holder you removed—use it with the next replacement disc.

Rugged construction throughout. Sturdy bonnet joint, well reinforced by heavy union ring—can be repeatedly dismantled and reassembled. Get better acquainted with the Crane No. 7 line . . . for steam, hot and cold water, air, oil, gas, gasoline, and many other fluids.

No. 7 Globe
Sizes ⅛ to 3-inch

No. 7 Angle
Sizes ⅛ to 3-inch

Specify No. 9 for Flanged Ends

No. 27 Check
Sizes ¼ to 3-inch

GLOBES, ANGLES, AND CHECKS

Ask for folder AD-1682R—contains full facts on the No. 7 brass valve line and the companion No. 27 check. Your Crane Representative has a copy for you—or write direct to address below.

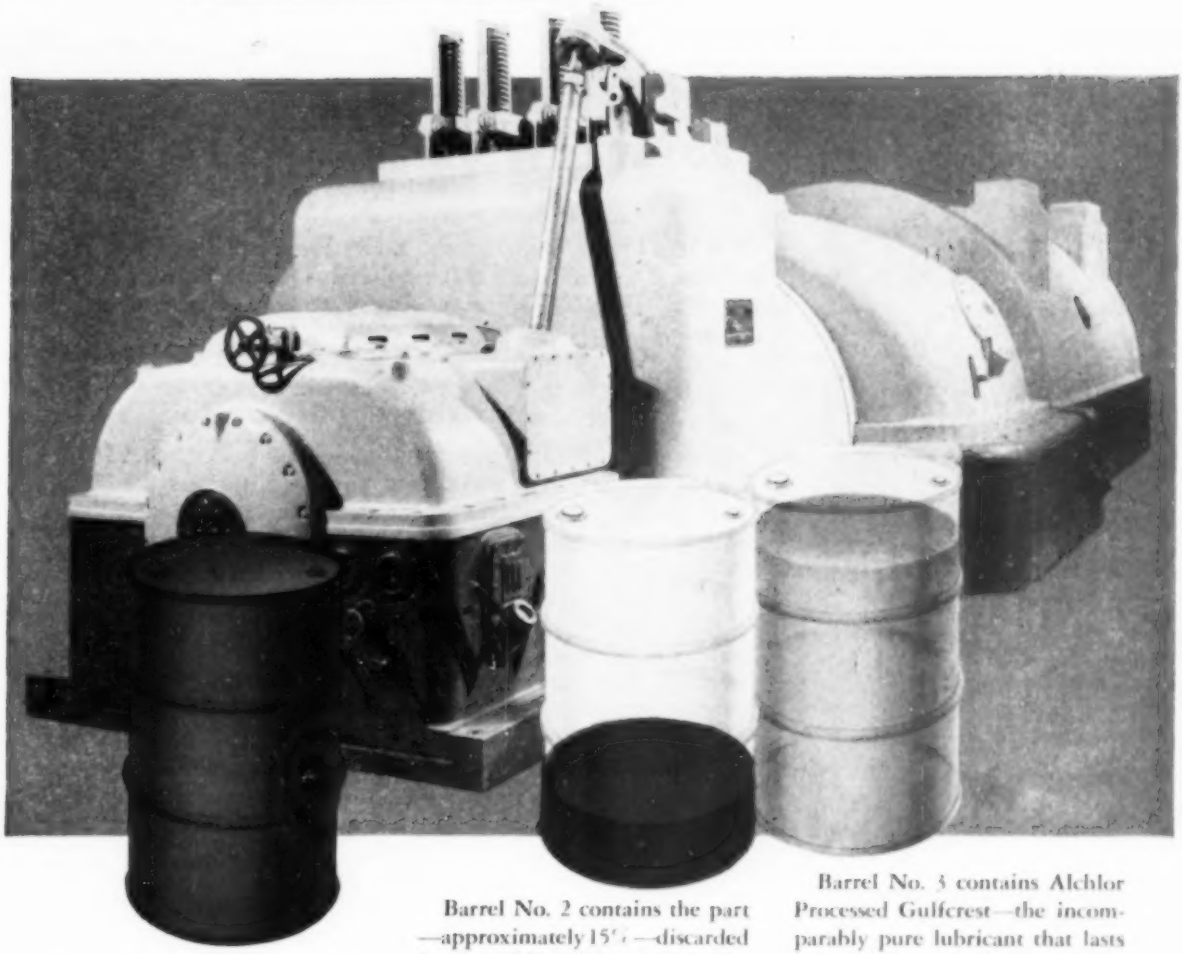
THE BETTER QUALITY . . . BIGGER VALUE LINE . . . IN BRASS, STEEL, IRON

CRANE VALVES

CRANE CO., *General Offices:* 836 S. Michigan Ave., Chicago 5, Illinois
Branches and Wholesalers Serving All Industrial Areas

VALVES • FITTINGS • PIPE • PLUMBING • HEATING

GULFCREST *is the only turbine oil that is super refined for superior performance by the ALCHLOR PROCESS*



Barrel No. 1 contains a highly refined oil that will become Gulfcrest. It has gone through the usual steps used in refining other turbine oils—but has not yet been Alchlor Processed.

Barrel No. 2 contains the part —approximately 15% —discarded by the Alchlor Process. This discarded portion contains unstable hydrocarbons which, if allowed to remain in a turbine oil, are likely to oxidize, increase neutralization number, form sludge, emulsifiers, and harmful acids.

Barrel No. 3 contains Alchlor Processed Gulfcrest—the incomparably pure lubricant that lasts longer, gives superior performance and helps keep your turbine systems clean indefinitely. To make Gulfcrest even finer, special inhibitors are added to give it still greater stability and protect against corrosion and foam.

Call your nearest Gulf office today and have a Gulf Sales Engineer recommend the proper grade of Gulfcrest Oil to meet the specific requirements of your turbines.

GULF INDUSTRIAL LUBRICATION

GULF OIL CORPORATION • GULF REFINING COMPANY • 1822 Gulf Building, Pittsburgh 30, Pa.

Now!...

An INTERRUPTING RATING in EXCESS of 100,000 AMPERES *for every set of fuse clips in your plant* . . . simply by installing FUSETRON *dual-element* FUSES

The Biggest Electrical Protection NEWS Since BUSS invented the FUSETRON Dual-Element FUSE

FUSETRON is a trademark of the Bussmann Mfg. Co., Division of McGraw Electric Co.

In 1947 tests made by the Electrical Testing Laboratories of New York, showed that on a circuit set to deliver 50,000 amperes, FUSETRON fuses in all tests cleared the circuit safely.

50,000 amp. Interrupting Capacity in 1947
becomes
100,000 amp. Interrupting Capacity Today

After years of intensive development work on FUSETRON fuses new tests were conducted under conditions that simulated the most severe field conditions and these tests were witnessed and verified by the Electrical Testing Laboratories of New York.

On circuits set to deliver in excess of 100,000 amperes, 30 to 600 ampere, 250 and 600 volt FUSETRON dual-element Fuses on each and every test cleared the circuit without belching flame or venting hot gases and with comparatively little noise.

Oscillograms of these tests interpreted by the Electrical Testing Laboratories, showed that the total available amperes including the direct current component, reached values as great as 165,000 peak amperes on 240 volt tests and as high as 212,000 peak amperes on the 535 volt tests.

This indicates that an interrupting rating of 100,000 amperes for FUSETRON dual-element fuses is a conservative one.

No interference with time-lag

In the development work to increase interrupting capacity in FUSETRON fuses it was kept in mind that the time-current characteristic must be maintained. Time-lag is of utmost importance to give proper motor and electrical protection and to eliminate needless blowing of fuses.

Remarkable results have been achieved. Interrupting capacity has been greatly increased while the time-current characteristic of FUSETRON fuses has in no way been disturbed.

Play Safe – install Fusetron Fuses throughout the entire electrical system!

Think!...

ALL THIS ADDED SAFETY *without changing a panelboard or switch... plus* 10 Point Protection of FUSETRON *dual-element* FUSES!

Maximum Safety

With FUSETRON Fuses there is no cascading of interrupting rating — no places where an excessive fault current might cause serious damage. Every FUSETRON fuse has an interrupting rating in excess of 100,000 amperes.

You don't have to worry about selecting chosen spots in which to *pay extra* for "safe" equipment. Wherever a FUSETRON fuse is installed you have safety as sure and dependable as you can buy — no matter what you pay.

No Maintenance Costs

When FUSETRON fuses have once been installed properly you can forget about them. They need no periodic inspections to see if they will operate safely.

Dust, fumes, corrosion or age cannot prevent a FUSETRON fuse from opening safely. There are no hinges, pivots or contacts to stick or slow down the operation of the fuse on short-circuit.

With FUSETRON fuses — you get safety — without one cent spent for inspection or maintenance costs.

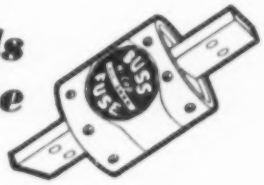
No Recalibration Costs

When a FUSETRON fuse does blow, there is no recalibration needed. As quickly as the fault in the circuit is corrected, you slip in a new fuse that has been CALIBRATED AT THE FACTORY BY ENGINEERS— a fuse that is as safe and dependable as the one that blew.

PLUS 10 POINT Protection with FUSETRON dual-element FUSES

1 Protect against short-circuits. **2** Protect against needless blows caused by harmless overloads. **3** Protect against needless blows caused by excessive heating — lesser resistance results in cooler operation. **4** Provide thermal protection — for panels and switches against damage from heating due to poor contact. **5** Protect motors against burnout from overloading. **6** Protect motors against burnout due to single phasing. **7** Give DOUBLE burnout protection to large motors — without extra cost. **8** Make protection of small motors simple and inexpensive. **9** Protect against waste of space and money — permit use of proper size switches and panels. **10** Protect coils, transformers and solenoids against burnout.

for SAFE PROTECTION on loads above 600 and up to 5000 Ampere install BUSS Hi-Cap FUSES



Tests have shown that BUSS Hi-Cap fuses have unlimited interrupting capacity on circuits of 600 volts or less.

They are designed to give protection against dangerous overloads as well as high fault currents — yet their speed of operation on heavy shorts limits currents to safe values. This minimizes damage to equipment and cuts down dangerous stresses on transformers.

When coordinated properly with FUSETRON dual-element fuses they will not open ahead of the fuses nearest to the fault. Thus trouble is isolated to the part of the circuit in which the fault occurs.

Added SAFETY on Old Installations

On installations where the increase in the capacity of the circuit has outgrown the interrupting rating of the circuit breakers, BUSS Hi-Cap fuses offer a safe and relatively inexpensive way to protect inadequate breakers against rupture in event of a bad fault.

ACTION THAT SAVES YOU MONEY

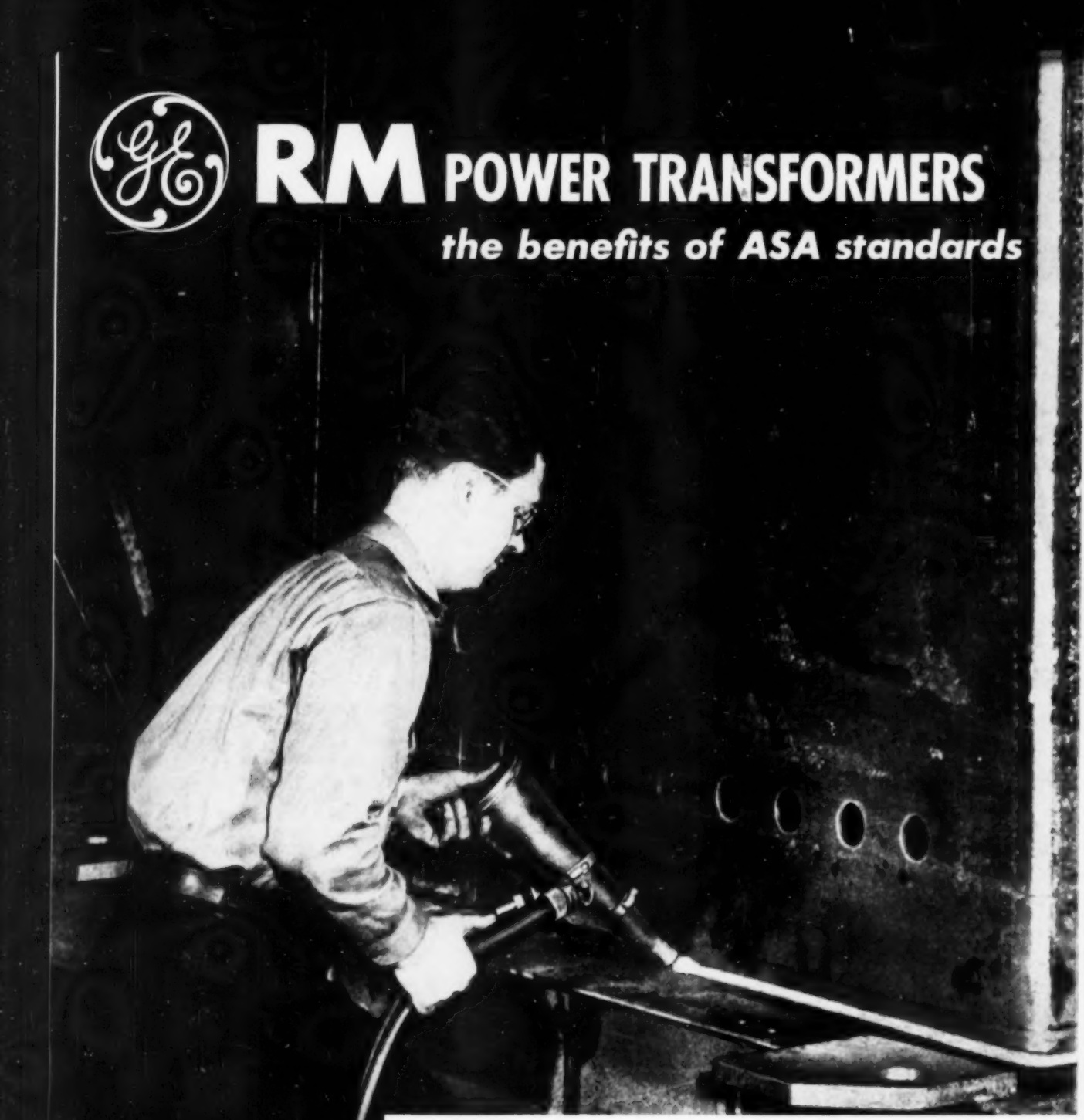
By passing the word along that all purchase and stock records should call for FUSETRON fuses on loads up to 600 amps—and BUSS Hi-Cap fuses on loads above that — you get action that begets money saving.

For blowing time charts or more information on FUSETRON Fuses and BUSS Hi-Cap Fuses write for Bulletins FIS and HCS.

Bussmann Mfg. Co., University at Jefferson, St. Louis 7, Mo. Division McGraw Electric Company

RM POWER TRANSFORMERS

the benefits of ASA standards



RM* brings you all these benefits

Repetitive Manufacture gives you the economy of a standardized product, yet with optional ratings and accessories sufficient to meet most special needs. Ordering is simpler, shipment is many weeks faster, and prices are up to 8% lower than those of nonstandard units.

**RM is the G-E designation for ASA-standardized power transformers 69 kv and below, 501 through 5000 kva single-phase, and 10,000 kva three-phase.*

LOWER PRICE

plus . . . . . .

Stronger liquid-tight tanks

because submerged arc welding strengthens major tank joints

When you need a transformer in the medium range, order a Repetitive Manufacture transformer, and you'll get all the benefits of ASA standards plus many extra advantages that give you better performance, easier handling and less maintenance.

STRONG, LIQUID-TIGHT TANKS, for example, virtually end damage and leaks from shipment and handling. Tanks are stronger because submerged-arc welding, pictured at left, strengthens all major tank joints. In this new process now in use at General Electric's new Medium Transformer Plant, an electrode wire is fed into an arch which is submerged in the granulated flux material deposited ahead of the arc by the welding head. Uniform welding speed is maintained by a driver geared to this head.

Developed by General Electric, this continuous welding process assures stronger, less brittle, more dependable welds of deeper penetration at major tank joints. Damage which can result from shipping and rough handling is minimized and tanks remain liquid tight.

MANY OTHER BENEFITS result from the advanced methods and processes used in General Electric's new plant at Rome, Ga. These include high dielectric strength because vapor-phase drying removes entrapped moisture; superior rust prevention because new Super Melaglyp paint finish lasts up to 150% longer; quicker delivery from faster, conveyorized production. Built solely to produce power transformers in the medium transformer range, this plant serves electric utilities and industry by turning out better products in a shorter time. You can get full information about RM power transformers by contacting your nearest G-E Apparatus Sales Office, or writing for Bulletin GEA-6108 to General Electric Company, Section 422-10, Schenectady 5, New York.

Progress Is Our Most Important Product

GENERAL ELECTRIC

SIMPLIFIED PURCHASING

SHORTER SHIPMENT

G.E.'s NEW ROME, GA., TRANSFORMER PLANT—built specifically to meet the growing trend to standardize power transformers.

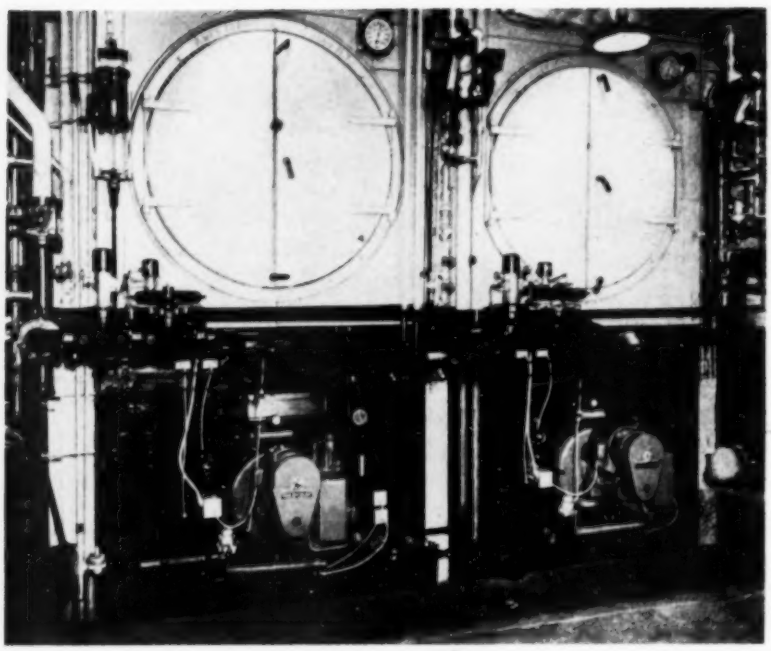
PHILIP MORRIS USES IRON FIREMAN

Protects manufacturing plants against fuel emergencies

In tobacco processing, steam is vital. When steam stops, the factories stop.

The big Philip Morris plants in Richmond, Virginia, are not dependent on a single fuel. Seven boilers in three steam plants can be fired with either gas or oil, and five of these boilers are also equipped for automatic coal firing. Iron Fireman equipment is used for firing all three fuels.

Boilers carry 135 psi steam pressure. Processing requirements impose severe demands on boilers and firing equipment. There are times when the boiler load is increased 200% in less than one minute. The response of the Iron Fireman burners is almost instantaneous, holding pressure variations to less than 3 psi. Under the former method of firing, steam pressure often fluctuated as much as 65 pounds—from 80 to 145 psi.—and safety valves would often relieve on sudden decrease of boiler load.



GAS-OIL

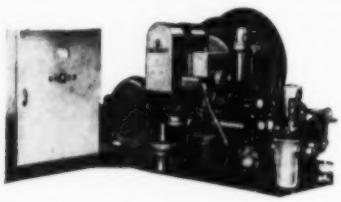
Two HRT boilers fired with Iron Fireman combination gas-oil burners. Fuel switch can take place at any time and requires only a few minutes. A third boiler in this plant is equipped for oil, gas or coal.

A three-fuel operation

Although heavy fuel oil is the basic fuel in these plants, the company finds it advantageous to use up to 1¼ million cu. ft. of gas each month to supplement oil firing. The switch from oil to gas and vice versa is accomplished in less than 10 minutes. For coal firing Iron Fireman Pneumatic Spreader stokers are used. Coal is automatically conveyed from main storage bunkers, and fired under automatic control.

Many other advantages in Iron Fireman firing

Much dryer steam is now available for processing, due to the steadier steam pressures maintained with the new equipment. Other improvements are these: 1. Lower refractory maintenance; 2. Lower maintenance on firing equipment (an average of less than $1.20 per month per unit since



PACKAGE UNIT FOR GAS, OIL AND GAS-OIL COMBINATION

This Iron Fireman package unit is much more than a conversion burner. It's a complete combustion system in which all elements are correctly balanced and integrated—a thoroughly engineered firing plant for all types of power and heating boilers. It includes burner (for oil or gas or both), fuel system, forced draft air supply, control panel, and pre-formed refractory combustion throat. Installation requires little more than bolting the entire unit to the boiler front and making service connections for power and fuel.

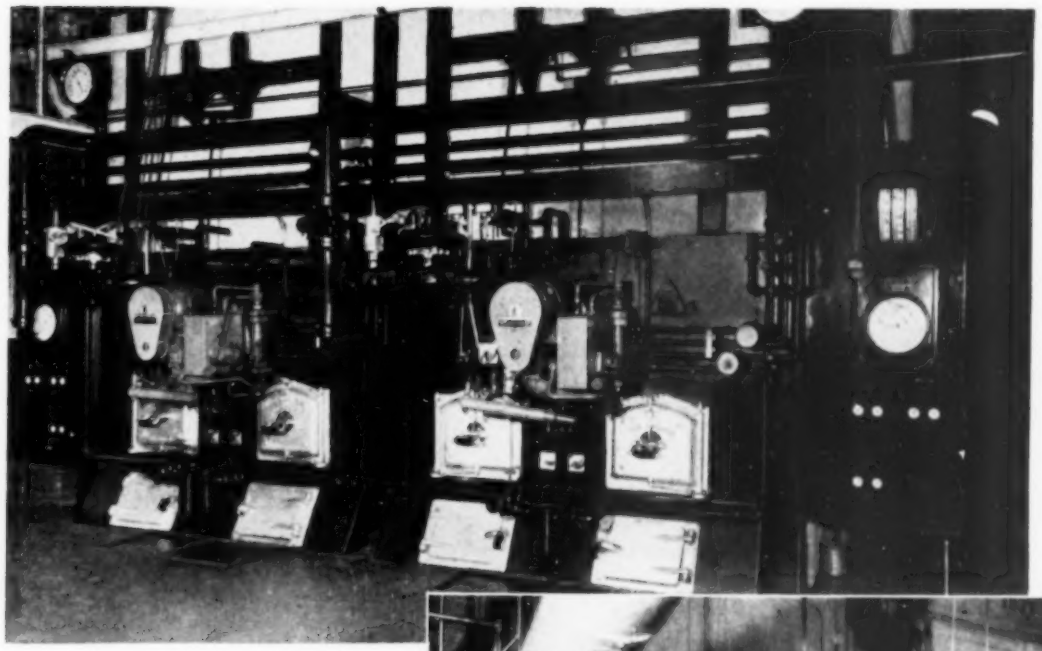
To the user this means a substantial saving in installation time and cost. But even more important, it means a factory tested and assembled unit. It is the most advanced and satisfactory method of modernizing a boiler plant.

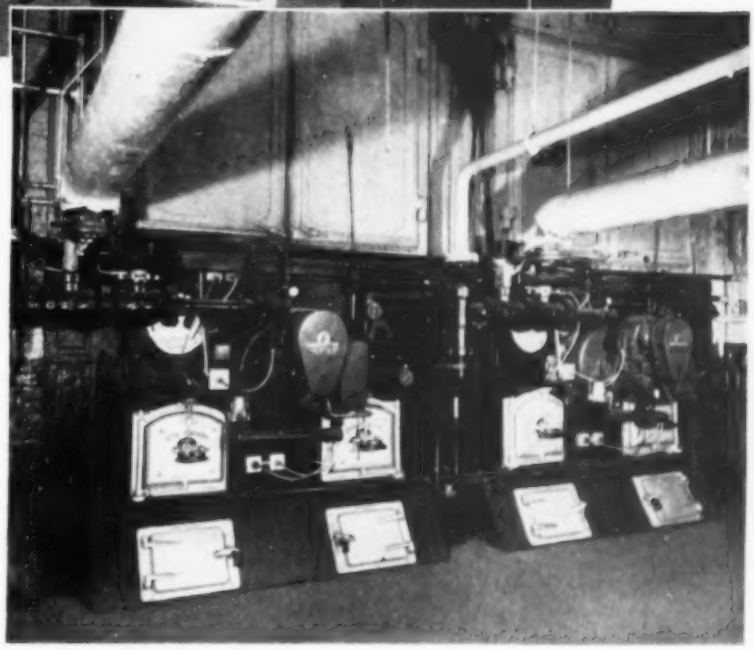
Iron

for oil, gas, coal firing

MULTIPLE FUEL FIRING

IN THREE STEAM PLANTS





GAS - OIL - COAL

Boilers above and at right are equipped with Iron Fireman combination gas-oil burners. All of these boilers are also fitted for automatic coal firing, using Iron Fireman Pneumatic Spreader stokers feeding direct from bunkers.

installation; 3. Elimination of bulky coal handling equipment; 4. Cleaner boiler rooms and factory; 5. Labor saving.

Avoid costly shut-downs

Fuel emergencies, due to interruption or short supply, can be disastrous. Yet protection may cost little or nothing when offset by the fuel and labor savings of Iron Fireman multiple fuel firing. For full information on Iron Fireman firing equipment mail the coupon, or call your Iron Fireman dealer.

Fireman®

for heating, processing, power

Iron Fireman Mfg. Co.
3052 W. 106th Street,
Cleveland 11, Ohio.

In Canada: 80 Ward Street,
Toronto, Ont.

Please send information on Iron Fireman multiple fuel firing. I am particularly interested in the following fuels:
☐ Oil ☐ Gas ☐ Coal

NAME

COMPANY

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CITY and ZONE STATE

"...through a person-to-person canvass..."

ROBERT S. MACFARLANE
President
Northern Pacific Railway Company

"Combine a good product with enthusiastic salesmanship, capably directed, and favorable results are reasonably certain. This winning combination through a person-to-person canvass recently added more than 8,000 employees of the Northern Pacific Railway to the Payroll Savings Plan for purchase of U. S. Savings Bonds. It is gratifying to me that the organized efforts of Northern Pacific personnel not only have resulted in substantially increased systematic saving and a greater investment in America's future by our employees, but that the Treasury Department is using our campaign as an example throughout the railroad industry in its efforts to step up regular purchases through payroll deductions."

The U. S. Savings Bond *is* a good product . . . Payroll Savers *are* enthusiastic Bond Salesmen . . . company spirit *was* good because everybody on the Road knew that Mr. Macfarlane was 100% behind the effort to increase employee participation in Northern Pacific's Payroll Savings Plan.

But, there was still another, and very important, factor in the success of Northern Pacific's campaign that added more than 8,000 new Payroll Savers — a Person-to-Person Canvass.

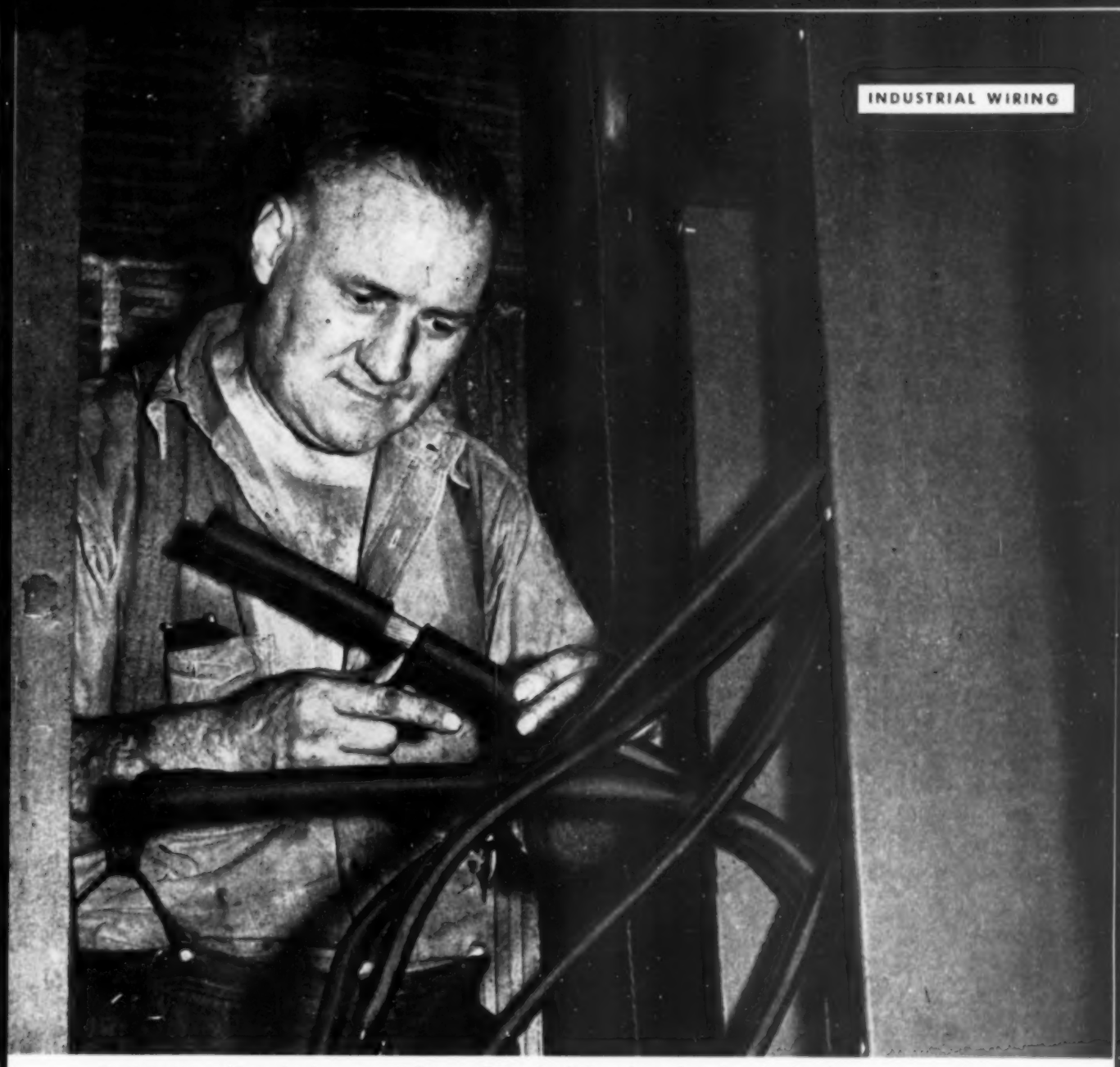
A good Person-to-Person Canvass is an organized employee effort that puts a Payroll Savings Application Blank in the hands of every man and woman in the company. There is no pressure, no drive to "sign up." Every employee is free to make his own decision. That's all there is to a Person-to-Person Canvass, but in literally thousands of companies, as on the Northern Pacific, a high percentage of employees *want* to build their personal security and are quick to join the Payroll Savings Plan when its availability and many advantages are brought to their personal attention.

Upwards of 8,000,000 employed men and women are enrolled in the Payroll Savings Plan, most of them as a result of Person-to-Person Canvasses. Each month these Payroll Savers invest more than $160,000,000. The 1954 goal is 9,000,000 Payroll Savers. It can be reached if you and other executives will take a personal interest in the Plan and what it means to your employees, your company and your country.

If your company has the Payroll Savings Plan your State Director will be glad to help you organize a Person-to-Person Canvass that should increase employee participation to 50%, 60% or more. If you do not have a plan he will show you how easy it is to install one. Write to Savings Bond Division, U. S. Treasury Department, Washington, D. C.

The United States Government does not pay for this advertising. The Treasury Department thanks, for their patriotic donation, the Advertising Council and

SOUTHERN POWER & INDUSTRY



FEWER SPLICES need be made when you run "all purpose" Durasheath. It can be run buried, overhead, in ducts . . . in one continuous run.

New trend in industrial wiring: Neoprene jacketed cable

Users find this tough, long-lasting "premium" cable actually costs little more to use . . . then cuts upkeep.

A chemical plant in Texas uses ANACONDA Durasheath* neoprene jacketed cable *as building wire* for power and lighting. A plant in St. Louis does, too. Another in Chicago.

The practice of using versatile Durasheath for building wire has caught on from coast to coast. And there's good reason.

This cable costs little more to use than the cheapest cable you can buy—and more than makes up this difference in long trouble-free service, lower maintenance costs!

Durasheath's tough jacket is made of specially compounded neoprene. It shrugs off heat, moisture, corrosive fumes. And it takes rough handling in stride. As demand for electricity rises, Durasheath provides added reliability.

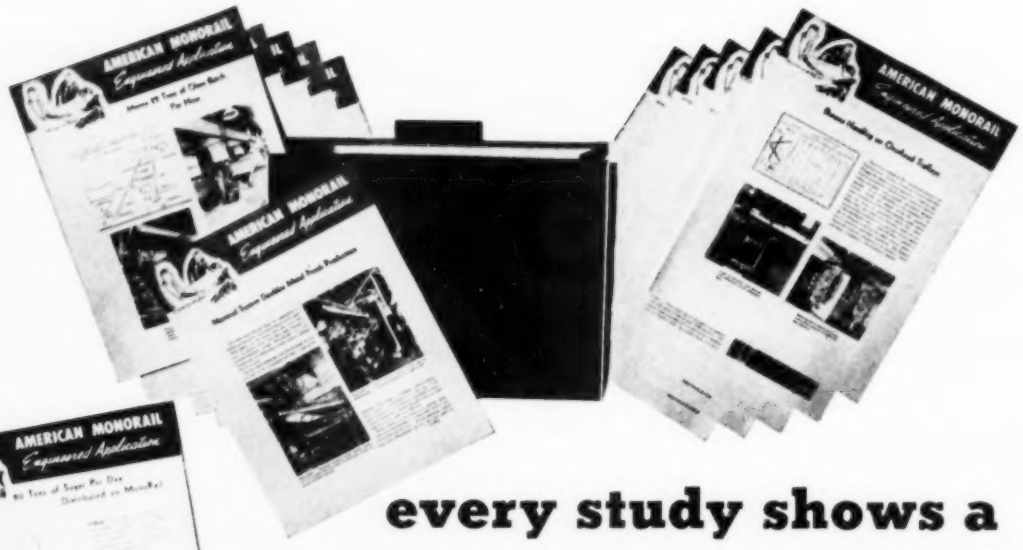
Industry engineers call Durasheath "good insurance." And it is!

Durasheath comes in all sizes, single and multiple conductor, copper and aluminum from 600 to 15,000 volts. You can run it in the ground, overhead, in damp ducts in *one continuous run* with minimum splicing. Want more information? See your Anaconda Representative or write *Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.*

*Reg. U. S. Pat. Off.

Durasheath neoprene jacketed cable

ANACONDA®

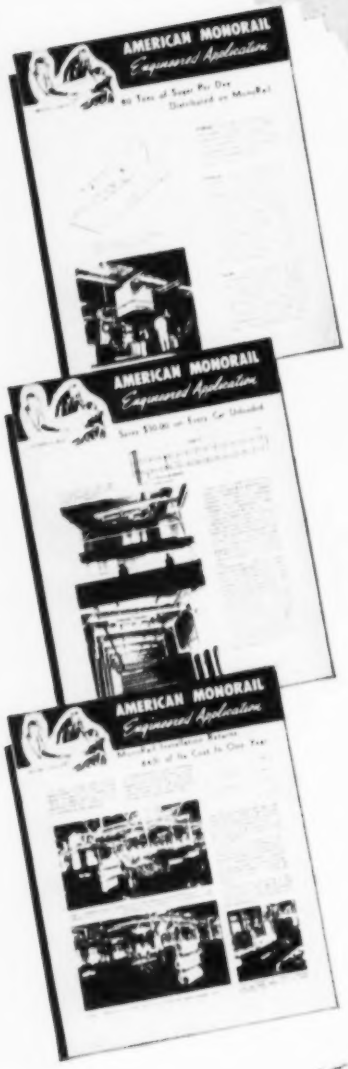


every study shows a handling saving

80 TONS OF SUGAR PER DAY

SAVES $30 ON EVERY CAR UNLOADED

RETURNS 84% OF ITS COST



Many companies are checking their handling problems against the American MonoRail Case Study File of "Engineered Applications." The file contains a series of case studies taken from many successful American MonoRail installations. One company saved $30.00 on every car unloaded. Another doubled metal finish production. A glass plant moved 22 tons of glass batch per hour. Another installation returned 84% of its cost in one year. These are just a few of the many studies covered.

If you want to lower your handling costs, speed up production and cut maintenance overhead, let us send you this file. Just drop us a line on your business letterhead, asking for "Engineered Applications File F-1."

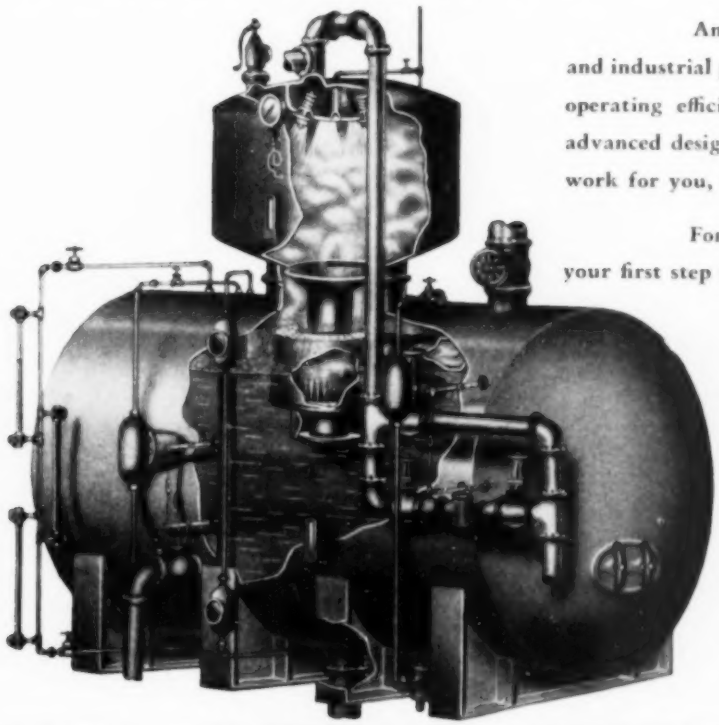
AMERICAN OVERHEAD HANDLING EQUIPMENT

AMERICAN MONORAIL COMPANY

13105 ATHENS AVENUE • CLEVELAND 7, OHIO

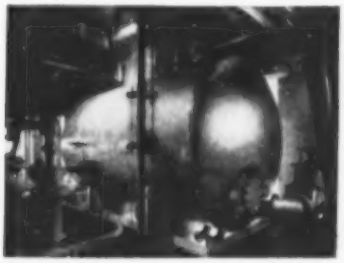
In Deaeration, too

BELCO Builds a Complete Line-

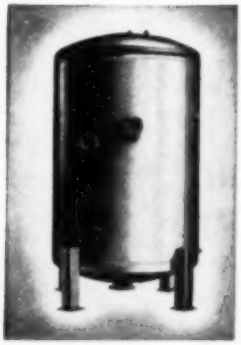


An increasing number of well known utility and industrial plants are using Belco equipment to increase operating efficiency and decrease operating costs. Belco advanced design and application experience can be put to work for you, too.

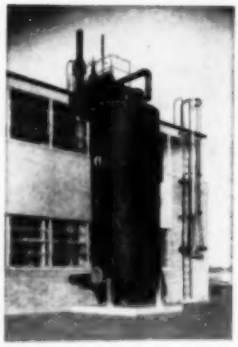
For technical assistance write or call Belco — your first step to lower costs.



SPRAY TYPE — Belco Deaerator in large eastern oil refinery. Has a capacity of 300,000 lbs/hr.

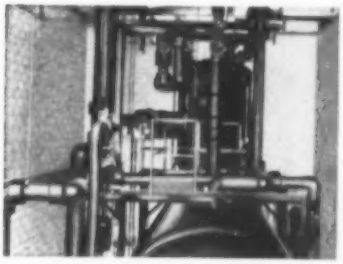


MARINE TYPE—Typical Belco marine heater furnished to shipyards. (Approved by Lloyds of London)

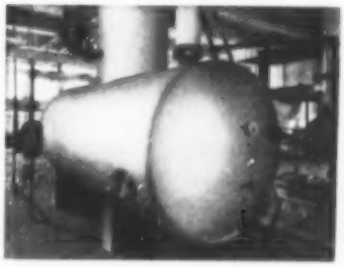


OPEN TYPE—Deaerator at large eastern pharmaceutical plant. Capacity of 80,000 lbs/hr.

VACUUM TYPE — Unit shipped set-up to midwestern utility. Has 150,000 lbs/hr capacity.



SPRAY TRAY TYPE — Belco Deaerator at New York State institution boiler house. Capacity 120,000 lbs/hr.



TRAY TYPE — Belco Deaerator at southern municipality. Has a capacity of 125,000 lbs/hr.

Belco

Boiler Feedwater Heaters • Water Softeners • Filters • Clarators
Demineralizers • Automatic Process Control Panels

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Special Qualities at Standard Prices
...in CHAPMAN Steel Valves

When you buy Chapman Steel Valves, you buy dependable operation and low maintenance cost — you can select steels to meet your specifications from over a dozen alloys made in Chapman's own steel foundry, under rigid scientific supervision.

When your valves are Chapman, you're sure they seat tightly and accurately, without jamming, chattering or wearing excessively. Close tolerances mean long service and little maintenance.

The Chapman Steel Valve line, — gates, globes, and checks, is complete for pressures of 150, 300, 400, 600, 900, 1500 and 2500 pounds and temperatures to 1000°F; all types of gates and globes excepting the 150 lb. class are available with 3 types of bonnet joints — welded, pressure seal, or bolted. Each has its own particular application depending on the medium to be handled.

Chapman's long experience and mass production mean economies. Quality is unsurpassed. So it pays to see Chapman first for every steel valve requirement . . . standard or special, gate, globe, angle or check. Chapman Steel Valves equal or exceed A.S.A. standards in every range. Write now for Catalog No. 20.

The CHAPMAN Valve Manufacturing Co.
INDIAN ORCHARD, MASSACHUSETTS

TIMELY COMMENTS

When to Study

SOME of the most modern educators are getting away from the recent trend of specialization in colleges. They are saying that if the student is taught to read and write, and is given a thorough foundation in mathematics and the basic sciences, he is then in position to concentrate on specialized subjects effectively. They point out that a foreign language may be learned fairly well in a few weeks when the need comes. They say air conditioning, or steam power, or hydraulics, may be picked-up rapidly if the student knows how to study and will concentrate.

We believe all of these things are true—and yet we do not subscribe to the old saying that "a little knowledge is a dangerous thing."

Actually, a little working knowledge of all branches of engineering can be of extreme value, even to the specialist. Except for the few pure scientists (and they are rare) nearly every engineer needs a good working understanding of what is going on in all branches of engineering, regardless of his specific obligations. Certainly an electrical engineer needs to know a great deal about mechanical procedures. And a mechanical engineer would get in a lot of trouble if he did not understand at least the fundamentals of electricity.

But in the face of the great need for knowledge on a variety of subjects—life is short. Today's engineer cannot be expected to know everything about everything. Generally, he must specialize to advance.

That leads us back to the subject of this item "When to Study." The answer is rather simple, and the procedure can be very pleasant. The first traits that a young engineer should cultivate are curiosity and a thirst for knowledge. With this desire, reading ceases to be a chore, and becomes a pleasure. Those who really want to learn will find the time and place for study.

No one can enjoy reading unless he learns to read rapidly and easily. Fortunately courses are available in nearly all parts of the country to help the real student develop his ability as a "speed reader." Once he has the desire and ability to read—a great deal of ground can be covered without actually cutting into his established periods of work and play.

Editors of all types of magazines are making every effort to present technical material in short easily understood terms. They are also packaging their articles as attractively as they can through use of drawings and illustrations. Their efforts are supplemented by television at home, and in-plant-training on the job. Consequently there is little excuse for the young engineer failing to keep up with the many new developments with which he will need to be familiar tomorrow.

Is This Call Necessary?

RESTRAINT is an admirable virtue—particularly with regard to hopping on that annunciator system and buzzing old Joe. Nothing is more disconcerting to the occasional plant visitor than the almost constant, raucous call of the in-plant communication system.

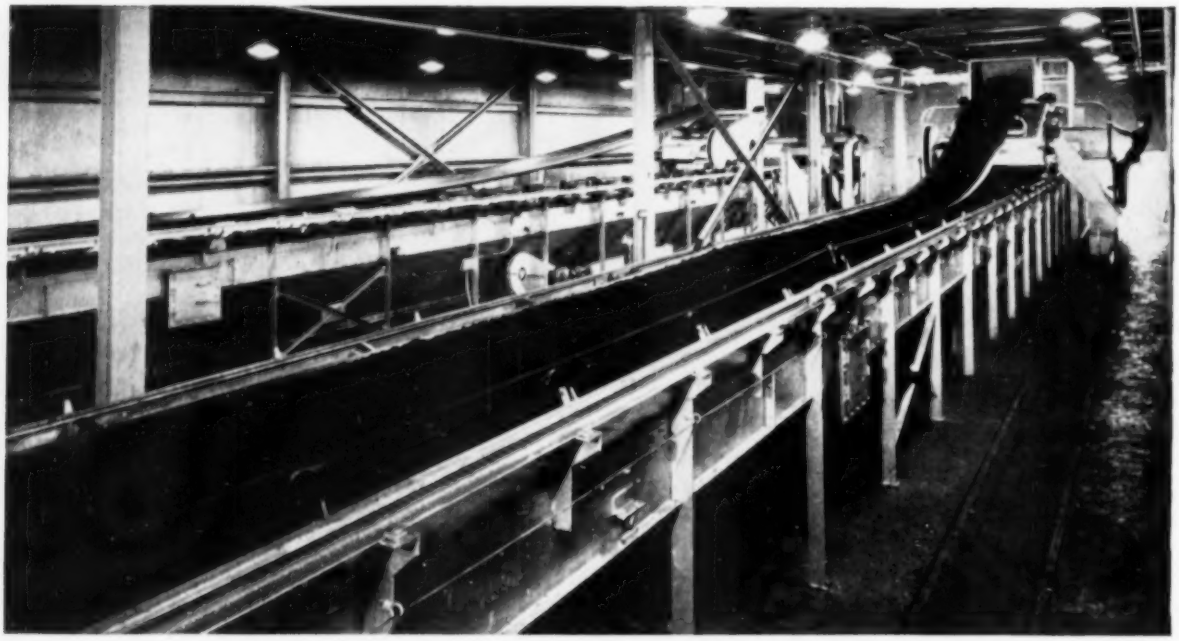
What's gone wrong? Who wants who? What's bursted now?, are unvoiced questions that cannot be avoided in the face of the constant clamor to get old Joe to the phone. If this is disconcerting to the business visitor, certainly it must also constitute a subconscious strain on the plant workers who are said to be accustomed to it.

Joe is in a boiler, or perhaps up on a ladder checking electrical circuits. He cocks an ear and listens. Yes! That's his call all right. "Maybe that old pressure regulator is cutting up again. Maybe it's the boss, and he is in a bad humor on Mondays." Anyway Joe's in a spot. If he didn't get hurt while being interrupted on a dangerous job, he at least has got to get clear and see what it's all about.

That goes on in some plants hour after hour, day after day. Joe doesn't have much privacy, or time to settle down and think things through. Must cost his company a lot of money. And Joe is just one of the "popular" guys that everybody wants to get in touch with.

BEAT HIGH TRANSPORTATION COSTS--

carry the load via belt conveyors



Engineered for long-life in coal handling, these twin Link-Belt 36-in. wide belt conveyors employ Series 100 troughing idlers, welded steel pulleys, and self-propelled trippers with bunker seals.

LINK-BELT offers you the "total engineering" so necessary for top efficiency

DESIGNED FOR OVERALL EFFICIENCY

Because of its unrivalled experience, Link-Belt can do a better job of gathering and analyzing all data. Proposals reflect this understanding of the most practical way to fit conveyors into your system requirements.

BUILT FOR LONG-LIFE PERFORMANCE

Link-Belt manufactures all components and related feeders and conveyors. You are assured of the right equipment because of this breadth of line. And Link-Belt will supply the highest grade belts engineered to the job.

DELIVERS FULL RATED CAPACITY

Link-Belt follows through on every detail of the job, including electrical controls and even wiring and foundations. What's more, Link-Belt will furnish experienced erection superintendents, staffs and skilled crews.

ASSURES SATISFACTORY PERFORMANCE

When you rely on Link-Belt as a single source for your complete system, Link-Belt accepts responsibility for placing it in full operating readiness. We will also supervise modernization of existing systems.

Next time you're in the market for one belt conveyor or a complete system, call a conveying expert in the Link-Belt office near you. It's his job to help you get the best in belt conveying at the lowest possible overall cost.

LINK-BELT

BELT CONVEYOR EQUIPMENT

LINK-BELT COMPANY: Executive Offices, 307 N. Michigan Ave., Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World. 13,390 D

INDUSTRY SPEAKS

SOUTHERN POWER AND INDUSTRY

These Basic Directions Will Help All of Us

Adapted from comments by **A. V. Wiebel**, president of the **Tennessee Coal & Iron Division** of the United States Steel Corporation, before the graduating class of the University of Alabama.

"SUCCESS is a relative term, and has as many different meanings as there are people looking for it. So, naturally, no two people are going to find it in exactly the same way, or achieve it in the same degree.

"Even though it would be impossible to draw a map, with an 'X' to mark the spot where success may be found, certain basic directions can be indicated. There are some fundamental rules that all successful men and women have followed.

"What are you going to do with that college diploma? Are you going to accept it as an end achieved, or are you going to consider it as a means to a greater end? If you are wise, you will look at it fondly, show it to your friends—and then put it away. You have finished your schooling: now you are going to be educated. Books and theory make a fine foundation, but they can never take the place of the learning you are about to acquire the hard way. If you expect to go forward in business or the professions, you must keep an open, seeking mind. Many of the things you have learned on the campus were the last word, yesterday. Tomorrow, new developments may have outmoded them.

"Set your direction. Make up your mind what you want from life and from your career, and then go after it. A great many people never get anywhere, simply because they don't know where they are going.

"Decide what you want: mere security or real success. If you will be content to spend the rest of your life making a comfortable livelihood, but do not particularly care whether you ever accomplish anything really outstanding—go ahead and take the job that pays a pretty fair salary and offers few avenues for advancement. If you hope eventually to become a real leader—to hold a responsible position from which you can make an outstanding contribution to your fellow men—then forget the dollar sign and take a job that will lead to something better.

"Don't be afraid to work. Only production gives concrete results. And don't think you are too good or too well educated to perform any task which comes your way—whether it be brain work or hand work. There is nothing undignified about plain, hard physical labor. A job loses dignity only when it is done poorly or half-heartedly.

"Try to draw a lesson from every job you perform. It is not enough just to learn the **what** about the work you are doing. Dig a little deeper to find the **why** and the **how.** Explore every aspect of your job, and see if there isn't a better way to do it. And make your mistakes work for you: because they, too, are a part of experience, which is the essential foundation for accomplishment.

"You are starting your career with a good education. I have mentioned two other things which you are going to need—direction and experience. **Education plus direction plus experience equals success.** Of education and experience, I would say this. Few things in this world are permanent. You may lose everything you have except the knowledge and wisdom which are the end result of these two. But they are yours as long as you live: and as long as you have them, you will never be completely defeated. Direction means merely setting your goal and channeling the force of your education and experience toward it. If you keep in mind these three things—education plus experience plus direction—how can you fail?

"Another decision which must be made is whom you are living for—yourself alone, or the human race, of which you are a part. It is good to be an individualist. Every man should stand on his own two feet. But don't become too wrapped up in yourself and your own little personal world. None of us is completely self-sufficient in this complex age. We depend upon the cooperative efforts of many people even to exist. We depend upon the work of others for food, clothing and shelter. We depend upon those who perform the governmental services which keep our relations with others running in a smooth, orderly manner. We lean upon others for spiritual guidance and physical aid.

"We could not, in good conscience, make withdrawals from this storehouse of social endeavor without also making generous deposits. If we tried, we should run up a deficit—not in the storehouse, necessarily—but in our own spirits. No selfish man was ever completely happy. Generosity is basic in human character. True happiness can be achieved only by the person who realizes that he is making a valuable contribution to the society in which he lives. The well-rounded individual sees himself as a part of his community and his nation.

Expansion provides rated capacity of 3,000 tons of ore per hour . . .

Baltimore's Canton Ore Pier

Conveyor belt system, storage-weigh hopper, and new electric unloading crane provide flexibility in bulk material handling.

LATE last year the Canton Company of Baltimore placed in service the fastest ship unloading tower on the Atlantic Seaboard, expressly designed for discharging bulk materials weighing up to 200 lb/cu ft and sized from granular to 12" lumps. In conjunction with a conveyor belt system and a storage-weigh hopper, completed the previous year, the new tower has increased the capacity of the Canton ore pier from 2 million to 5 million tons annually.

The Canton Railroad Ore Pier, the oldest common carrier ore pier on the Atlantic Seaboard is located on the north bank of the Patapsco River. It was built in 1916 and was the first railroad facility to provide an electrically operated, grab-bucket type, tower for the rapid discharge of bulk materials. West side of the dock, which juts southward into the river, has a deep water exposure of over 1250 ft; east side has some 800 ft. Four railroad tracks running the entire length of the dock are numbered 1, 2, 3, and 4 beginning on the west side. Unloading tower or Crane No. 1 is located south of Crane No. 2.

Problem Was Complex

The only way to increase the discharge capacity of the ore pier was to increase the number of unloading towers. The four loading tracks on the dock were adequate to handle the output of the two smaller towers. But these tracks could not handle without congestion the output of a third tower.

The conveyor belt system offered not only a less expensive but also a more efficient answer to the problem of rapidly moving the discharged ore from the three towers to railroad cars and minimized the lack of tail room on the south end of the dock.

To avoid sacrificing any of the existing pier trackage, an apron 11 ft wide and 805 ft long was added to the east side on the south end. This apron supports the 1664 ft long "high line" conveyor belt system 20 ft above the deck of the pier.

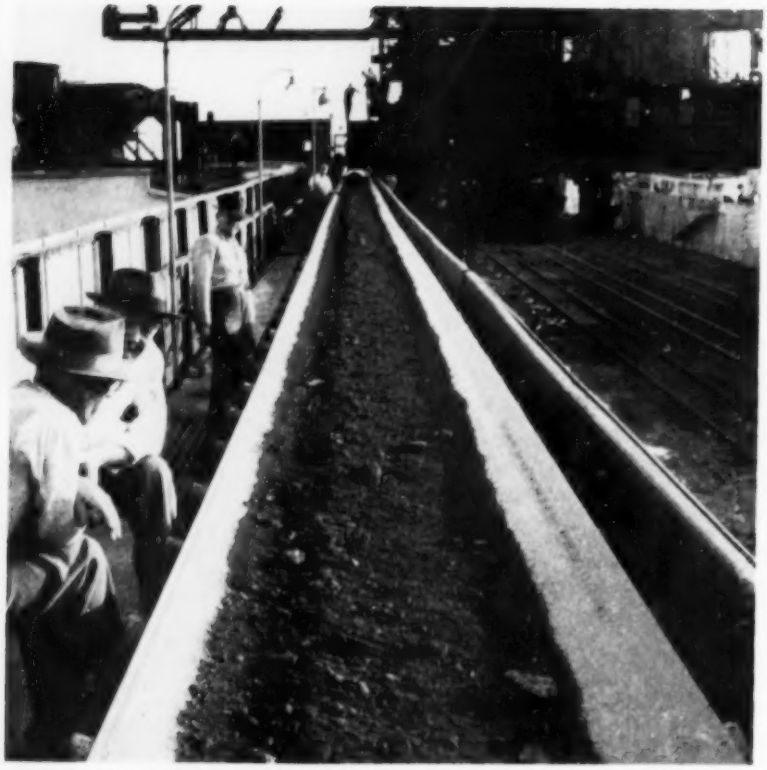
The "high line" carries a 48" vulcanized rubber conveyor belt from the outer end or the bulkhead, 1336 ft to a transfer station. There the ore is discharged onto a "slope conveyor" which extends 268 horizontal feet at an angle of incline of 16 degrees to a 1500 ton storage hopper, 100 ft above the tracks.

▶ CONVEYOR BELT SYSTEM—Includes a "high line" conveyor belt running from the south end of ore pier 1336 ft to a transfer station north of the dock. There the ore is transferred onto a slope conveyor 276 ft long, which lifts the ore on an incline of 16 degrees to the top of a storage and weigh hopper. Both belts are 48" wide vulcanized rubber and have a capacity of 3,000 tons per hour.

▶ ELECTRIC UNLOADING CRANE—Portal type structure with two hinged aprons which can be raised to clear a vessel's superstructure while tower moves from one hatch or vessel to another. Weighs approximately 1035 tons. Adjustable voltage drive uses amplidynes (rotating regulators) to produce refinements in peak torque requirements and simplification of control equipment with consequent reduced maintenance.

▶ STORAGE-WEIGH HOPPER—Divided surge bin (capacity varying from 600 to 1800 long tons) discharges into two feeders which service four weigh hoppers mounted one over each track. Weigh hoppers of 50 tons capacity each will weigh and automatically release any desired quantity of ore into cars below. Scales provide weigh ticket for each car loaded and tape recorder tallies complete cargo.

AERIAL VIEW of Canton Ore Pier's bulk ore unloading and handling facilities. Newest modern electric crane is shown in the foreground. Note the third-of-a-mile long conveyor belt running from pier end to transfer station and storage hopper. Pier is operated by The Cottman Company and is served by The Canton Railroad, a terminal switching line which has direct connections with three trunk lines serving the port. ► ►



HIGH-LINE CONVEYOR view from the transfer station looking south. Belts on both high-line and slope conveyors are 48" wide vulcanized rubber and have a capacity of 3,000 tons per hour.

Rated capacity of both belts is 3000 tons per hour—sufficient to handle the combined output of the three unloading towers.

The conveyor provides faster discharge for the increasing number of single grade of ore cargoes because the 1500 ton storage hopper allows the towers to continue full speed digging while train crews replace loaded cars with empties.

Conveyor Belt Data

The conveyor belt system was designed and the construction supervised by Robins Engineers Division of Hewitt-Robins, Inc. Belt is a Hewitt-Robins Maltese Cross belt with seven plies of 42 ounce long staple cotton duck with the two bottom plies nylon filled. Top cover is $\frac{3}{8}$" thick, including two bias load cord breakers next to the carcass. Bottom cover is 1/16" thick. Belt is field vulcanized to be endless.

Robins steel troughing idlers are used throughout. Because of the abrasiveness of the ore, the return idlers which come into contact with the carrying side of the belt are of the rubber disc type. Heavy Robins cast iron pulleys are used with extra heavy babbitted pillow blocks.

Drive pulley has its 7½" diameter shaft direct connected by double engagement gear type flexible couplings to a heavy duty roller bearing herringbone speed reducer driven by a 250 hp G-E wound rotor motor. This 870 rpm motor drives the belt at a speed of 545 fpm. A vertical gravity take-up is located in back of the drive and inside the junction house to provide for operation changes in belt length. An additional screw take-up at the tail end allows for permanent belt stretch.

The 48" slope conveyor, receiving ore from the high line conveyor, is 275 ft long with a lift of 75 ft. Its Hewitt-Robins Maltese Cross belt is of the same specifications as that for the high line except that it has 9 instead of 7 plies. Belt is driven by a heavy cast pulley mounted on an 8" diameter shaft. Both ends of this shaft are direct connected through flexible couplings to speed reducers, each of which is driven by a 200 hp G-E wound rotor motor. Belt speed is 615 fpm. A heavy roller holdback is keyed to the drive pulley shaft to prevent run-back under load in case of power failure.

Power for all three drive motors is derived from a 750 kva Westinghouse substation, which transforms incoming 13,200 volts to 480 volts. There is a Philip Carey 4.2 corrugated siding windguard on the east side of the "high line." Slope conveyor is enclosed in a Careystone gallery, and the same material has been used to sheath the transfer station, substation, and storage hopper.

Existing Crane Changes

A new hopper was installed on the east side of Crane No. 1. Two 42" wide manganese steel feeders with a common drive were provided to transfer the ore from this hopper to the new "high line" conveyor belt.

If these two feeders, side by side, had discharged the ore at right angles to the high speed line conveyor, there would have been considerable wear and tear on the belt. A short, rugged transfer conveyor was therefore mounted on the crane, directly over and in line with the high line conveyor. This transfer conveyor not only takes the pounding of the heavy ore, but also eases it onto the high belt in the direction of its travel and close to its speed. This short belt, having little tension, is of less expensive construction and can easily be replaced. In order to provide room for this new equipment, it was necessary to shorten the old weigh larry travel so that it would service only tracks No. 1 and No. 2.

A new receiving hopper was installed on the west or ship side of Crane No. 2 and some 11 ft lower than the old hopper on the east side so as not to interfere with the arc of bucket travel. The main deck under this hopper was depressed to accommodate two 42" wide manganese steel feeders with a common drive, similar to those installed on Crane No. 1.

These feeders carry the ore southward over the main girder of the crane and deliver to a new 48" conveyor 2A. This conveyor is in-

clined, runs east along the south face of the crane and delivers in turn to a new reversible conveyor 2B. Conveyor 2B when running eastward feeds the high line conveyor and when running westward services track No. 3. A weightometer is installed on conveyor 2A so that any material going to track No. 3 can be weighed. Crane No. 2 which originally fed to track No. 4 only, can now service tracks No. 3 and No. 4, whereas Crane No. 1 will deliver to tracks No. 1 and No. 2.

New Unloading Tower

Tower or Crane No. 3 was designed and built by Heyl and Patterson, Inc., of Pittsburgh in cooperation with W. T. Brooks, chief engineer, Canton Railroad, and H. E. Hildt, superintendent, The Cottman Company.

Like the two older unloading towers, it is a portal type structure with two hinged aprons, which can be raised to clear a vessel's superstructure while the tower moves from one hatch or vessel to another. The aprons support rails for the bucket trolley runway and permit a bucket travel of 76 ft beyond the centerline of the west columns and 72 ft beyond the centerline of the east columns. Total bucket travel is approximately 210 ft.

Method of Operation

The main trolley, moving along the trolley runway, operates a clamshell type grab bucket which lifts the ore through the ship's hatches and dumps it into a 100 ton receiving hopper on the west side of the unloader. For direct discharge, a 45 ton travelling weigh hopper takes the ore from the receiving hopper and loads it into cars spotted on any of the three easterly tracks. The weigh hopper has a speed of 80 fpm. For discharge onto the pier's conveyor system, the travelling weigh hopper couples to an Oro feeder and positions it under the receiving hopper.

The Oro feeder discharges onto a 42" conveyor belt running along the north side of the tower to a junction over the 48" "high line" conveyor on the apron of the pier. The "high line" operates at 545 fpm and has a capacity of 3000 tons per hour.

CONVEYOR BELT SYSTEM and supporting 1500 ton capacity storage hopper was designed by Hewitt-Robins, Inc. High-line conveyor runs from south end of ore pier 1336 ft to transfer station (center). Ore is transferred onto a slope conveyor 276 ft long, which lifts it to storage and weigh hopper in background.

Design Features

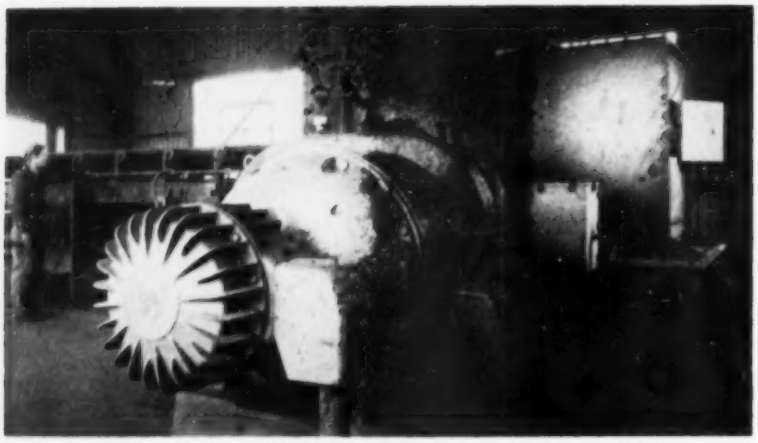
In discharging ore cargoes, speed is a major consideration because it results in quicker vessel turnaround. There is not only the problem of providing the fastest discharge for that part of the cargo which can be dug in full bucket loads at the fastest duty cycle rate, but also the problem of unloading that part of the cargo which remains after this "free digging" portion has been removed. This "clean-up" material varies from 20-70% of the cargo depending on the type of vessel and ore.

This new unloader incorporates the latest design and engineering in bucket handling equipment. Duplicate drives for holding and closing drums have replaced the single motor and clutch assembly. Low inertia mill motors and adjustable voltage control permit the use of larger buckets on a faster cycle with better bucket control and a much lower power consumption than is possible with constant potential d-c power. These features not only result in less damage to ships but assure greater reliability and reduced maintenance both electrically and mechanically.

To improve the "clean-up" efficiency, the bucket, together with its hold and close motors, has been mounted on a turntable type trolley which permits the operator to rotate the bucket 105° in either direction.

An anemometer attached to the east apron mast records wind velocity, operates a warning signal, and prevents tower traverse during

NEW UNLOADING TOWER (fastest on the Atlantic Seaboard) incorporates the latest design and engineering in bucket handling equipment. Small housing on the Southwest corner of the tower controls its lateral movement up and down the dock and the raising and lowering of the aprons. Adjustable voltage drive uses amplidynes (rotating regulators) to produce refinements in peak torque requirements and simplification of control equipment with consequent reduced maintenance.



250 HP G-E motor runs the high-line conveyor belt. This is the interior of and second story of the transfer station. Ore drops through chute at right onto the slope conveyor on ground floor.

hazardous periods by breaking the traverse control circuit when wind velocity exceeds 38 mph. The Heyl and Patterson automatic rail clamps are interlocked and automatically actuated by the anemometer.

Capabilities of New Unloader

No. 3 tower has an operating cycle of 38 seconds based on a mean bucket hoist of 60 ft, a mean trolley travel of 50 ft, and a bucket load of 20 tons. The approximate speed of bucket hoist is 420 fpm and of bucket lowering 500 fpm. Bucket trolley travel is 600 fpm.

The trolley is designed to handle a bucket of 280 cu ft, which is equal to 22 tons of ore weighing 157 lb/cu ft. Apron hoist time from the horizontal to vertical position is 3½ minutes. Tower travel is 90 fpm. Under conditions which permit the bucket to grab 20 tons at each bite every 38 seconds, this unloading tower is capable of discharging a vessel at the rate of 1900 tons per hour.

The Cottman Company have tremendous flexibility in planning the discharge of a cargo. They can concentrate as many as three towers on a single ship, using to best advantage either the conveyor system or direct discharge.

Storage-Weigh Hopper

The third-of-a-mile long conveyor belt, previously described, feeds to the storage hopper where swinging gates divert the ore to either one of the two legs of the hopper. This arrangement permits the operators to hold one kind of ore in one leg of the hopper and run a second kind of ore through the other leg. This is done when switching from one grade of ore to another and allows the hopper to continue operating while one leg is being swept clean to prevent impregnating one type of ore with the residue from a previous lot or cargo. The two tracks serving either leg have been worked simultaneously when all three towers are working on a single vessel with a single lot of ore.

Weigh hoppers are equipped with Fairbanks-Morse scales, which can be set to weigh and then automatically release any desired weight of ore into cars spotted on the loading tracks below.

Weigh baskets and scales are of considerable interest. Ore cars of many types and capacities are encountered, varying from 50 ton cars with a load limit of 120,000 to 128,000 lb to 90 ton cars with a load limit of about 210,000 lb. Consignees specify either drop pocket hoppers or gondolas. In loading a high density commodity like ore in either hoppers or gondolas AAR loading rules require that as much of the load as possible be centered over each truck. Therefore, the Canton Railroad specified a single dump system.

Realizing that by holding the number of crews operating at the same time on the ore pier to a minimum the possibilities for delays due to interference would be minimized, the Canton Railroad specified sufficient loading capacity on each of the four loading tracks to handle the "free digging" discharge rate of tower No. 3.

A loading rate of 1200 long tons per hour was established for each track. This insured that no more than three crews would be used on the ore pier at any one time regardless of the number of towers using the conveyor system.

Car Loading Time Cycle

On the basis of loading 1,200 long tons per hour into cars at 140,000 lb per car, we have 19.2 cars per hour. Because two dumps from the same hopper are required to load each car, this means 38.4 dumps per hour, or in round figures one dump each 90 seconds and one car each 3 minutes. Using this, Hewitt-Robins arranged the following scale cycle:

Start feeder	2 seconds
Run feeder	50 seconds
Stop feeder plus time delay	10 seconds
Weigh loaded hopper incl. printing	5 seconds
Open gate	5 seconds
Empty hopper	5 seconds
Close gate	8 seconds
Weigh empty hopper incl. printing	5 seconds
Total Cycle	90 seconds

All of these operations are controlled from one panel by each weigh master in his room. Weigh masters' rooms are hung under the weigh hopper floor so as to give a clear unimpeded view of the ore dumping from hopper to car.

Operating procedure is as follows:

Conductor hands weigh master set of cards giving in sequence numbers and load limits of the cars in the empty ore train. When first car is spotted, weigh master sets scale for weight of the dump which will normally be a little less than one-half of the load limit.

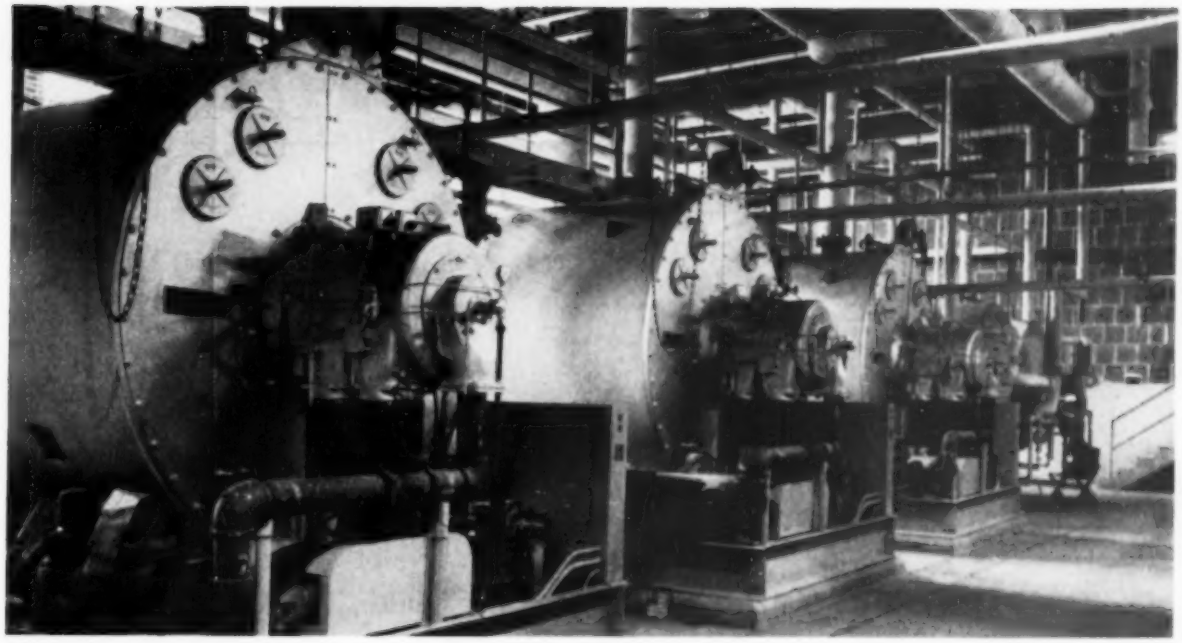
He then starts the feeder. As hopper fills, scale pointer revolves. When it reaches predetermined setting, the feeder stops automatically. There is then a few seconds time delay to allow any loose material to drop off the feeder, after which the operator enters his cards in the printweigh and records the weight of the load. By pushing the start button of the motor-operated gate, he opens the gate and dumps his load.

When hopper is empty, he closes the gate and stamps a second reading which records the weight of any material hanging up in the hopper. Cycle is then repeated.

During the 50 second interval for filling the hopper the cars are shifted so the next car may be loaded. Railroad signal lights provide communication between the weigh master (or conductor in the loading station) and the engineer on the ore train.

The predetermined settings mentioned above will vary with the load limits of the ore cars. By means of an ingenious device, the weigh

(Continued on page 122)



Packaged Automatic Boilers in Modern Alabama Hospital

by DOUGLAS PALMER
Palmer & Lawrence, Birmingham, Alabama

THE Druid City Hospital, Tuscaloosa, Alabama, is a 240-bed general hospital incorporating all of the most modern design considerations including three 300 hp gas-fired (or light oil) Powermaster packaged automatic boilers. The hospital is heated by a radiant hot water system. Surgical, delivery, emergency, and administrative areas are air-conditioned with provision for future air-conditioning of all patient rooms.

Natural gas is burned although an emergency supply of No. 2 fuel oil is kept on hand against the need for immediate conversion to oil firing.

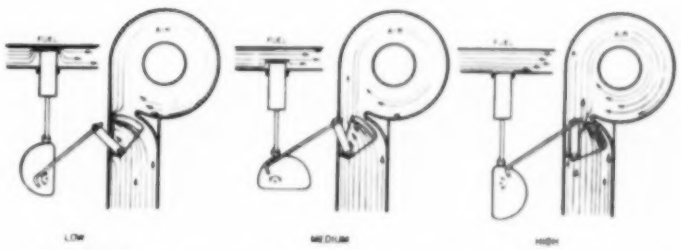
Present fuel costs are averaging $530 per month. Before occupying their new building Druid City Hospital occupied a wing of an old Army hospital utilized by the University of Alabama who operated the boiler plant. Steam was purchased on a contractual arrangement.

Steam is utilized at various pressures up to 100 psi for heating, sterilization, cooking, and the laundry. The Powermasters respond well to variations in steam load throughout the day due to the simplicity and effectiveness of the full-range modulation control system.

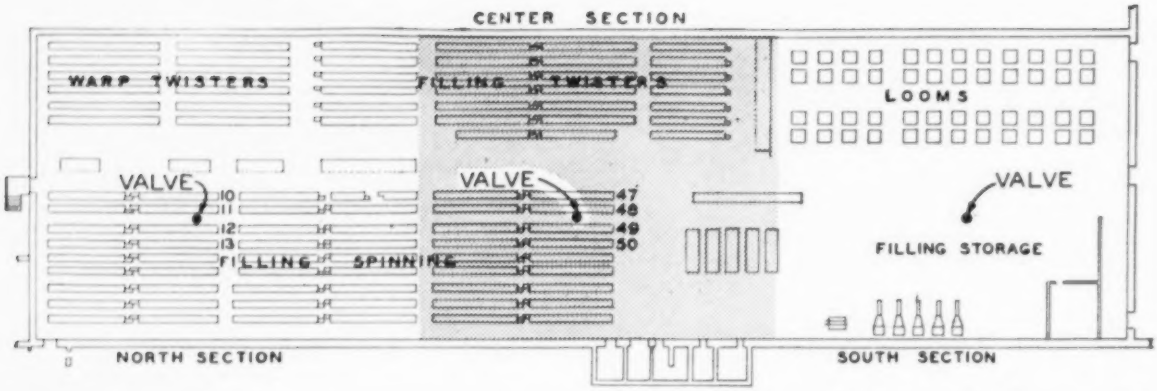
It is necessary both for cleanliness and economy that these intermediate firing rates be maintained at uniformly high efficiency by properly proportioning air and fuel to the burner across the entire operating range. In the Orr & Sembower Powermaster boilers a pressure controlled potentiometer positions the damper motor which adjusts the fuel valve and air damper according to steam demand as reflected by boiler pressure.

The fuel and air ratio to both the Voriflow air-atomizing and pre-mix gas combination burners with which these boilers are equipped is thus correctly proportioned for uniform efficiency at all intermediate points from 100% full load firing rate down to 20-30% of full load. The mechanism is an adjustable cam which positions the fuel valve and an adjustable linkage which positions the air damper. These adjustments are set and locked during factory fire-

(Continued on page 72)



ADJUSTABLE CAM controls the fuel valve and an adjustable damper linkage controls the air supply to the Orr & Sembower Voriflow burner for uniformly high efficiency within the operating range from 20-30% to 100% of full boiler load.

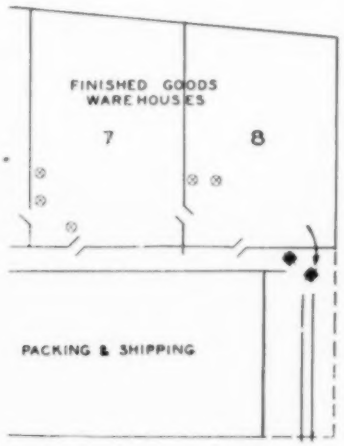


Alabama Mill shows employees location of all shut-off valves . .

DRAIN VALVE locations are indicated in this sketch by arrows. On chart posted in plant, valves are spotted by red dots.

Reduce Post-Fire Water Damage

Charts and Photos do the Job



WAREHOUSE is posted so employees can spot drain valves. Since the dry valve is located at the southern end of the warehouse "just to the left of the steps going up to the truck loading platform," a double precaution is taken to show the outside of the entrance to the valves and location of valve under loading platform.

WHEN a fire occurs in a plant, very often the sprinklers continue to spread water long after the fire is out. Water damage to equipment and materials in process is usually as great or greater than that actually caused by the fire.

Much of this excessive damage can be eliminated by informing employees where to cut off the main valve serving the sprinklers; or if the building is multi-story, where the drain valve is located to stop water in the sprinkler system above from draining out in the floors below.

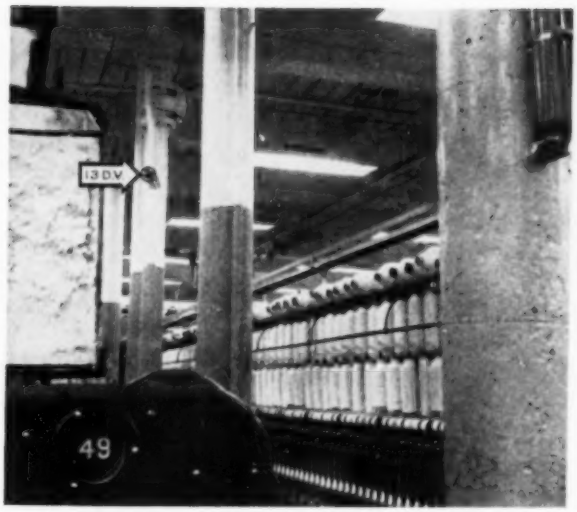
Learning about water damage through experience, Tallassee (Ala.) Mills have instituted an educational program for their supervisors and employees so that everyone knows the location of the "Post Indicator Valve" of the incoming line and the location of the drain valve. When the fire is out, the sprinklers can be cut off at the PIV and the drain valve can be closed.

Where is the Valve?

Under the supervision of the safety department, of which Dewitt Wisener is director and Mack Bell is safety engineer, floor plans of each department are posted in that department with location of the drain valves by number indicated in color. Adjacent to the floor plan is a photograph of the drain valve with its number pasted thereon; the photograph takes in enough of the surrounding scenery and machinery so that the operator or supervisor may become familiar with the territory and know the location of the valve long before a fire occurs. For instance, in the drain valve picture for one of the spinning rooms, the post is shown on which the valve is located, and spinning frame No. 49 is clearly visible.

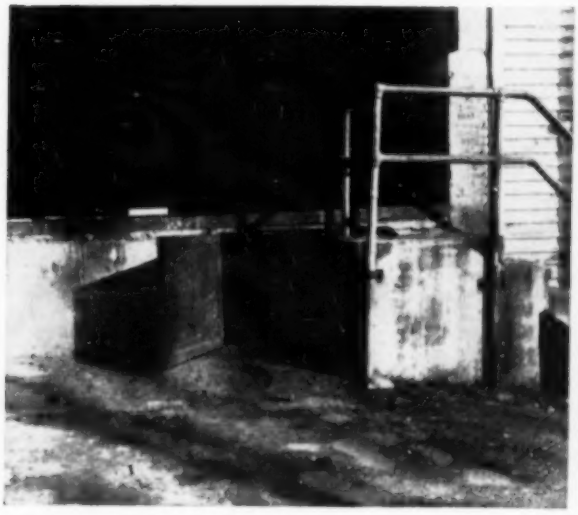
The location of the valve is explained to each employee, and with the floor plan and picture posted permanently in the department, the location of the valve soon becomes as familiar to the employee as any other fixture in the room.

The Post Indicator Valve which cuts off all water to the sprinkler line serving the department is also located by photograph. This, too, is posted in the department. Although this main PIV is usually located outside the mill, the employees in the department are shown the location. In the picture,

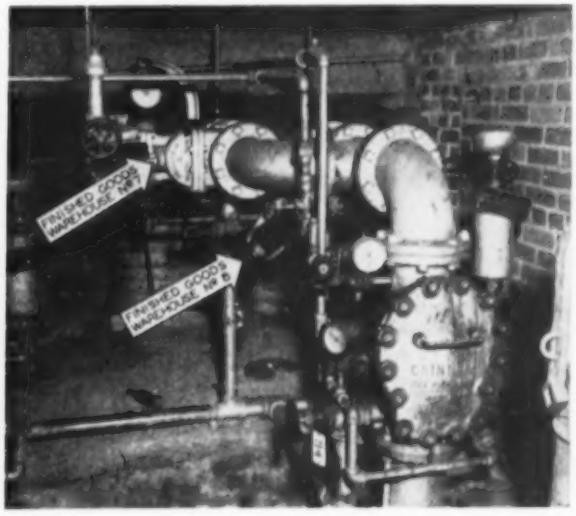


DRAIN VALVE LOCATION—Instructions appearing under photo (posted in plant department) read: "In case of fire, no valves in sprinkler system shall be closed until all fire is extinguished. After closing No. 13 PIV (Post Indicator Valve) open No. 13 DV (Drain Valve) located in filling spinning near spinning frame No. 49, as quickly as possible."

POST INDICATOR VALVE LOCATION is outside the plant. Note that it is identified in photo. A tag on the Post Indicator Valve further identifies it when employee reaches the valve. Instructions explain when valve must be closed and what it controls. Reference is also made in instructions to Drain Valve to further reduce water damage (see photo and caption at left).



EMPLOYEES know valve is inside this door. Instructions under picture tell when to use valve and how to reach it.



HERE IS what it looks like inside the door. The valves are identified by tags. Instructions are very explicit.

enough of the surrounding scenery is taken in so that the PIV is readily recognized by its position relative to a building, a tree, another valve, etc.

Furthermore, the PIV is labeled on both the photograph and on the valve.

In instances where the PIV is located in a room or under a building or loading platform, the safety department has taken no chances for confusion on the part of an excited employee. The location of the PIV is shown on the floor plan, the outside of the room or its entrance is shown by photograph just as the employee will see it, the inside of the room or position under building is photographed with the valve identified, and upon arriving at the PIV the employee finds a tag on the PIV which confirms that this is the PIV for his department (or the department needing the water cut off).

Training Cuts Losses

A lot of work? To be sure. But water causes a lot of damage, and the educational program is considered insurance. Also, the photographs and room layouts are the simplest means of getting the point across to both old and new employees.

Serving South Central Oklahoma . .

OG&E's Outdoor Station

THE AUTHOR—Mr. Stout was employed by the Oklahoma Gas & Electric Company in 1937 as engineer in the generation department. After 4½ years military service, he returned to OG&E as construction engineer on 5 major power station projects. He was project superintendent of the Arbuckle Station construction until promotion to his present position of chief mechanical engineer.

Design follows single unit pattern with three additional units planned . . two artesian wells supply entire water demand with comfortable margin . . centralized control . . pressurized boilers.

By J. B. STOUT
Chief Mechanical Engineer
Oklahoma Gas and Electric Company
Oklahoma City, Oklahoma

THE Arbuckle Station of Oklahoma Gas and Electric Company has been in service since mid-March 1953. Located in the foothills of the Arbuckle Mountains, from which it obtained its name, it is the first completely outdoor type central station built by the Company. The design follows the single unit pattern, and ultimate development of the site provides for three additional units.

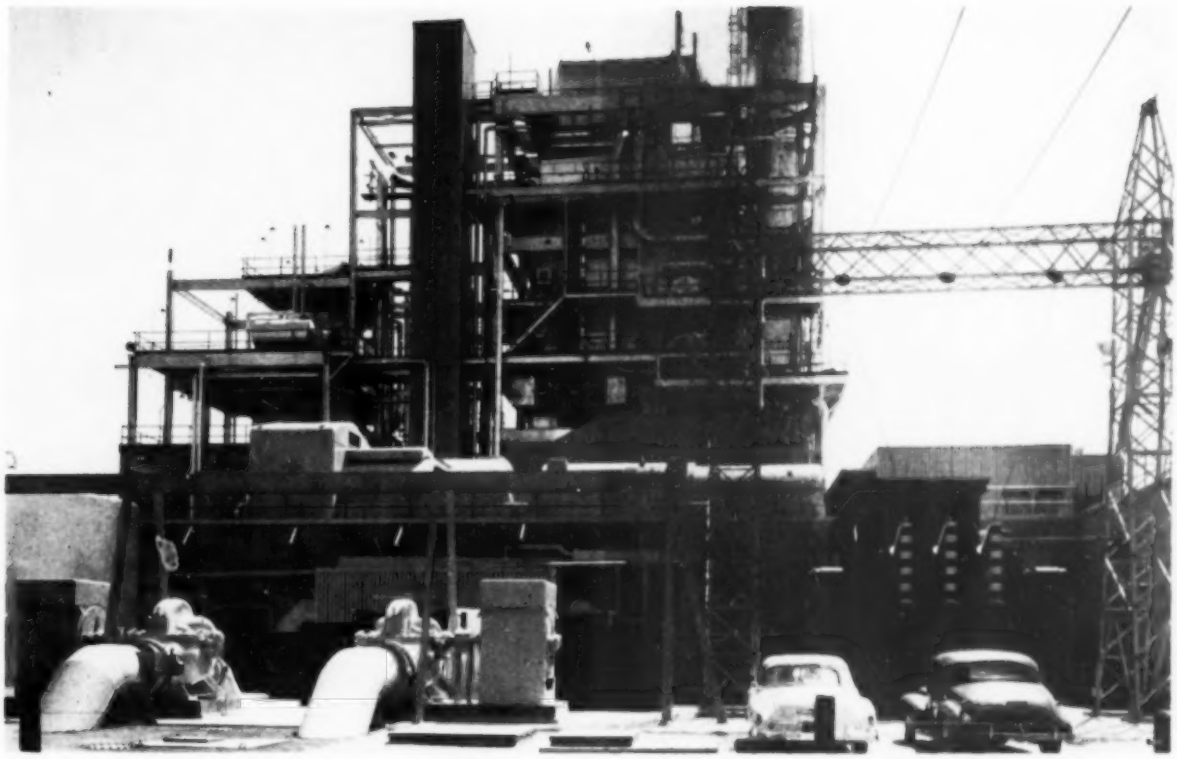
The unit is rated at 81,500 kw capability with the high pressure heater cut out and the intermediate heater throttled. It is the largest single unit within the system of ten major stations, totaling 456,000 kw. It serves the south central portion of the State through four 66 kv transmission lines, and is connected to the major transmission trunks with one 138 kv line which, during station outage, will carry the load of that area.

The cost, approximately $8,800,000 excluding substation and switchyard, includes site development for future extensions.

Although Arbuckle is classed as an outdoor station, the space beneath the operating floor is enclosed to house some auxiliary equipment, pump control boards, and maintenance facilities. The structure, of reinforced concrete which supports steel superstructure containing the evaporator, deaerating heater and pipe supports, rests on 4 ft diameter reinforced concrete caissons poured on rock at an average depth of about 14 ft below grade. The operating floor is non-slip type quarry tile for wearing service and appearance.

Two insulated metal panel enclosures are located front and back of the boiler at the operating

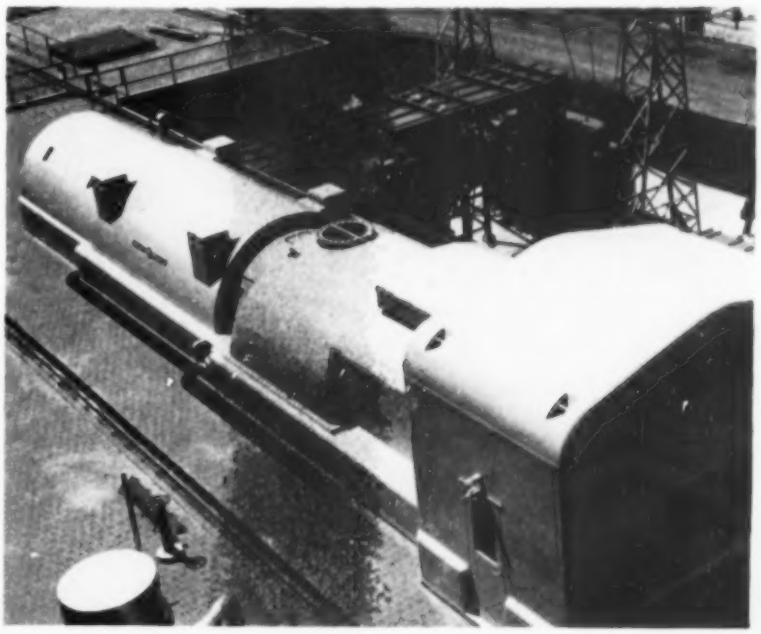
STATION PERSONNEL—Leo E. Cahill (seated) is chief engineer of the Arbuckle Station; Jake D. Niblack (standing) is assistant chief engineer and results engineer. Other personnel include an assistant results engineer, chief electrician, mechanical foreman, 4 control operators, 5 auxiliary operators, 2 electricians, 2 clerks, 4 watch engineers, 2 relief operators, 3 mechanics, and 6 helpers.



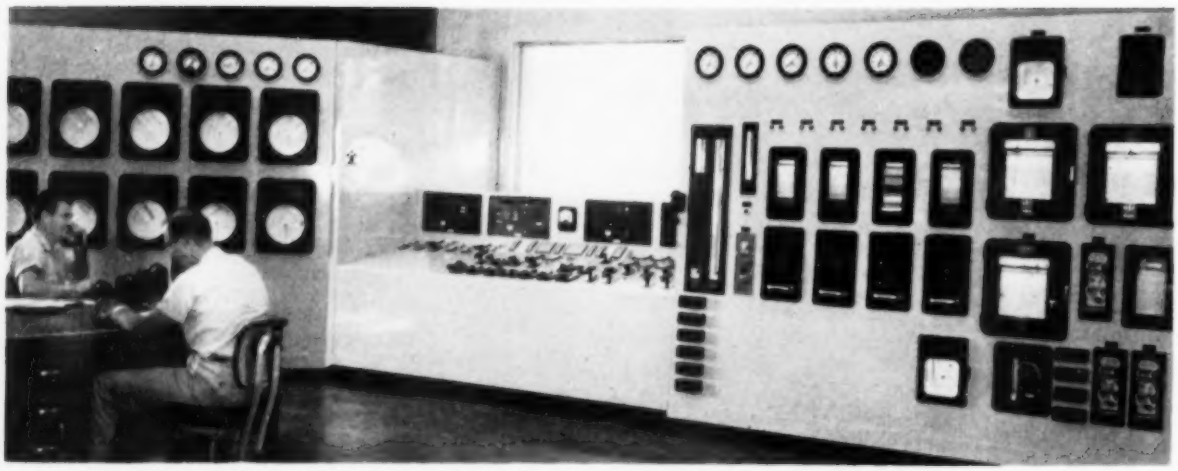
ARBUCKLE STATION at Sulphur, Oklahoma, showing two 2300 volt, 700 hp base ventilated motors driving cooling water pumps; outdoor switchgear; and 69,000 volt, 82,500 kva power transformers. The 60,000 kw General Electric hydrogen cooled turbine generator can be seen on the open operating deck (center).

level for offices and the control room. Both are year-around air conditioned. Inter-com and plant telephone systems adequately serve for communication between control room, office and various operating positions throughout the station and grounds. A separate steel warehouse provides storage facilities for spare parts and heavy maintenance equipment.

Access to the station site required a two-span reinforced concrete bridge located on the property. Railroad spurs were built from a branch line for direct shipment of equipment and materials. An enclosure around the end of the condenser was designed of insulated sheet steel panels similar to that used on the office and control room enclosures. The enclosure was necessary because the turbine support is exposed and



WALK-IN ENCLOSURE at turbine and exciter and isolated phase bus duct to auxiliary and main transformers. Operating floor extends over water treating house, upper left. Cover plates are provided over Gantry crane rails. Feedwater heater in immediate left foreground.

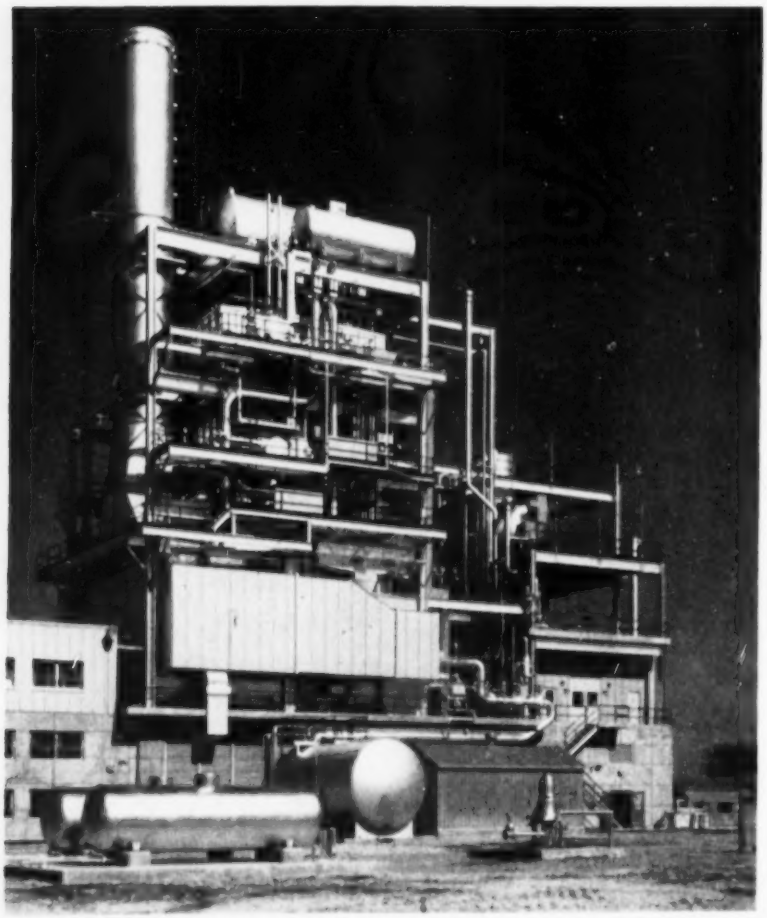


CONTROL ROOM with boiler board at left. Operator can look over bench board at boiler burners, and also see, by mirrors, boiler water columns. Air conditioning units are located in far left corner behind boiler. This room will accommodate a similar control board design for future units.

forms the north wall of the ground floor building enclosure.

Primary fuel is natural gas which is supplied from nearby newly developed fields. The reliability of natural gas service made it possible to realize certain economies in the design of standby fuel facilities, which consist of a 20,000 bbl fuel oil storage and handling equipment for maintaining operation during short periods of emergency only.

Future fuel will be pulverized coal, and the station equipment is so designed and arranged that coal handling and storage equipment may be installed without interruption to normal operation, except for converting burners and tapping the boilers for ash handling. Such an outage would be coincidental with a scheduled maintenance outage.



SOUTH ELEVATION of OG&E's Arbuckle Station. Twin propane storage tanks in left foreground; with acid storage tank immediately behind them. Office is on left side of building. Control room is visible on right at stair landing. Roof tanks are for soft and service water.

Artesian Wells

The water source for the station is unique in that two artesian wells supply the entire demand with a comfortable margin. During construction one small well was drilled to a depth of approximately 500 ft, which produced artesian flow of approximately 70 gpm. Although the water contained H_2S in concentrations of approximately 2 ppm, it was satisfactory for all construction use. Slight aeration liberated the H_2S.

The two deep wells were drilled to a depth of 840 and 868 ft. Each

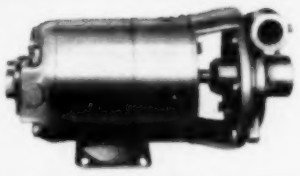
LOOK TO THE LEADER—*LOOK TO PEERLESS*

For All Your Needs for END-SUCTION PUMPS

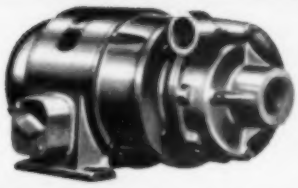
IT'S THE PEERLESS *Fluidyne* LINE

FOR ALL THESE MODELS

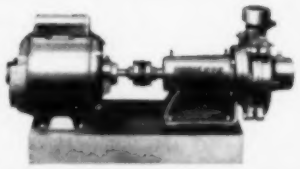
¼-1½ hp FACEMOUNT



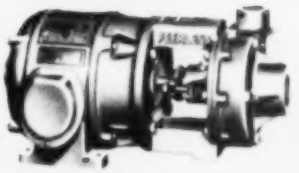
2, 3, 5 hp FACEMOUNT



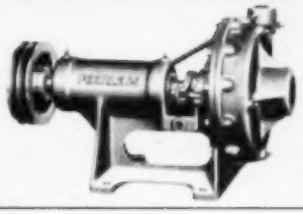
FLEXIBLE-COUPLED Fractional hp



5-50 hp DIRECT CONNECTED



FLEXIBLE-COUPLED Integral hp



FLUIDYNE LINE CHARACTERISTICS

HEADS:	Up to 260 ft.
CAPACITIES:	5 to 5500 gpm
MOTOR SIZES:	¼ to 150 hp

PEERLESS PUMPS

For All Your Air Conditioning Applications There's One Line of Pumps That Has Been Proved—The Peerless Fluidyne Line.

THOUSANDS SOLD FOR:

(1) COOLING TOWERS
(2) CHILLED WATER SERVICE
(3) HEAT EXCHANGERS
(4) COMMERCIAL AND RESIDENTIAL AIR CONDITIONING
(5) BOOSTERS
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Stainless Steel Shaft
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In Models up to 5 hp Type PE
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(Same as used in Largest, Highest Quality Industrial Pumps)

Cast Iron Case
(Heavy and Durable)

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(Fully Guaranteed)

It's the Fluidyne Line for ALL THESE OUTSTANDING FEATURES:

They're ECONOMICAL. Designed with economy in first cost, installation, maintenance and operation in mind—all without compromise in quality.

They're DURABLE. Every consideration has been given in design and construction to assure long service life even under abnormal service.

They're EFFICIENT. In all sizes, types and models the Fluidyne line is characterized by high performance ratings.

They're VERSATILE. Indoors or out, every general utility pumping service can use Peerless Fluidyne Pumps.

They're COMPACT. Space costs money; Fluidyne pumps fit neatly into both piping and pumping layouts as well as into sub-assemblies.

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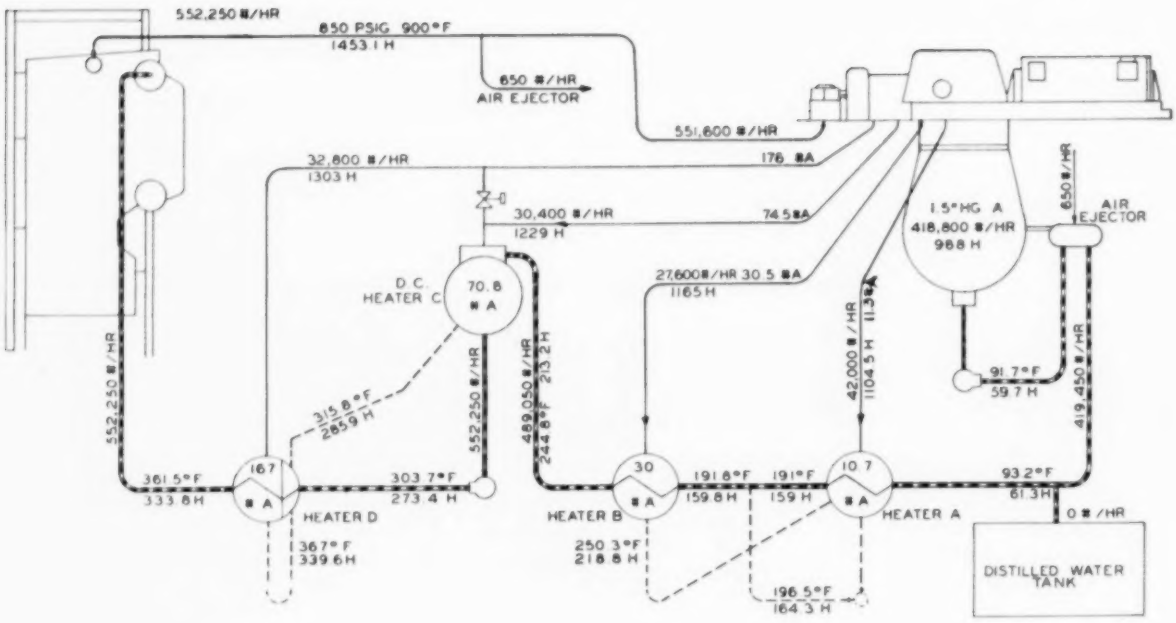

FLOW DIAGRAM
OG&E's Arbuckle Station

1—630,000 lb/hr steam generating unit, 950 psig—910 F; 1—60,000 kw ASME-AIEE turbo-generating unit, 850 psig—900 F.

Gross Generator Output	66,000 kw
Auxiliary Power (4.5%)	2,970 kw
Net Sent Out	63,030 kw
Steam Rate to Turbine	8.37 lb/kwh
Btu/kwh to Turbine	9,366
Boiler Efficiency	83.34%
Btu/kwh Generated	11,238
Btu/kwh to Auxiliary	530
Btu/kwh sent out (100% Operating Eff.)	11,768
Plant Thermal Efficiency	29

well will produce over 1000 gpm artesian flow. Water is admitted to one end of a 3½ million gallon capacity reservoir through aerating trays, where it moves the full length before vertical make-up pumps pick it up for admission to the cooling water system.

Treatment of cooling water make-up consists of acid injection to maintain pH in the range of 6.5 to 7.5. Boiler make-up has a normal treatment through filters, softeners and sodium catexers.

Centralized control was one predominate design consideration, and the results have been excellent performance and reliability of the station with ease by an operative force consisting of three positions: watch engineer, control operator, and auxiliary engineer. The station is normally operated on automatic combustion control under base load conditions. Load scheduling is done by the system dispatcher.

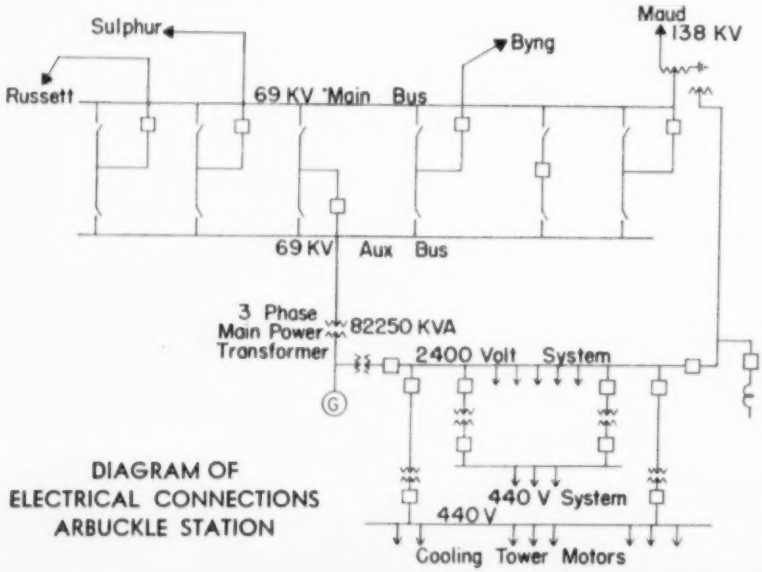

DIAGRAM OF
ELECTRICAL CONNECTIONS
ARBUCKLE STATION

Equipment Features

The steam generators are Babcock & Wilcox pressurized stirling boilers provided with two division walls in the furnace, rated at continuous capacity of 630,000 lb/hr, and equipped with a tubular air heater. Superheaters provide steam at 910F at loads from 350,000 lb/hr by means of a submerged drum type attemperator.

Nine ring-type burners will fire natural gas. Fuel oil is burned by standard merchanical atomized guns. Ignition is also dual in case of emergency. Natural gas torches can be connected to a propane system if there is a failure of natural gas supply.

The boiler will perform a somewhat better efficiency on pulverized coal, and conversion to pulverized coal can be accomplished during any normal outage after coal handling facilities have been installed. Design has provided for the addition of these facilities without interruption of operation,

555-ft. 4-in. of HORTON STEEL PENSTOCK

Above: One of the 27-ft. sections of Horton Steel Penstocks being assembled at the Buford Dam Project.

. . . for Buford Dam Project

A key project for the control of the Apalachicola River System, the Buford Dam Project is now under construction on the Chatahoochee River, 35 miles northeast of Atlanta, Georgia. Chicago Bridge & Iron Company supplied two 22-ft. diam. by 216-ft. 8-in. penstocks and one 10-ft. diam. by 122-ft. penstock for use in three tunnels connecting the forebay and tailrace at the Dam.

Steel for the penstocks was fabricated at our Birmingham plant, shipped to the Buford Dam site and assembled in 27-ft. sections by one of CB&I's experienced erection crews. All longitudinal and girth seams for the built-up sections were welded with an automatic welding machine while the stiffener angles and tunnel girth seams were manually welded.

The Buford Dam penstocks are typical of the heavy welded steel plate work Chicago Bridge & Iron Company is equipped to do. We have complete facilities at all four plants for designing, fabricating and erecting structures for a wide range of services. When planning welded steel plate structures of any sort, be sure to write our nearest office for information, estimates or quotations. There is no obligation on your part.

CHICAGO BRIDGE & IRON COMPANY

Atlanta 3.....2180 Healey Bldg.
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Cleveland 15.....2218 Midland Bldg.
Detroit 26.....1534 Lafayette Bldg.
Houston 2.....2132 C & I Life Bldg.
Los Angeles 17...1545 General Petroleum Bldg.
New York 6.....3312—165 Broadway Bldg.
Philadelphia 3....1646—1700 Walnut St. Bldg.
Pittsburgh 19.....3252 Alcoa Bldg.
Salt Lake City 4.....545 W. 17th South St.
San Francisco 4.....1531—200 Bush St.
Seattle 1.....1345 Henry Bldg.
Tulsa 3.....1628 Hunt Bldg.

Plants in BIRMINGHAM, CHICAGO, SALT LAKE CITY, *and* GREENVILLE, PA. *In Canada*—HORTON STEEL WORKS, LIMITED, FORT ERIE, ONT.

PRINCIPAL EQUIPMENT—Arbuckle Station
Oklahoma Gas and Electric Company

GENERAL DATA

Name of Station—Arbuckle Generating Station, Oklahoma Gas & Electric Company
Station Site—Sulphur, Oklahoma
Total Generating Capacity—66,000 kw at present
Total Boiler Capacity—630,000 lb/hr
Steam Conditions—850 psig, 900 F
Cooling Water Source—Deep Artesian Wells
Design and Construction—Sargent & Lundy, Engineers; Oklahoma Gas & Electric Construction Dept.

TURBINE-GENERATORS

Turbine—One—General Electric Co., 3600 rpm, 66,000 kw
Generator—One—General Electric Co., 66,000 kw, 70,588 kva, 2830 amp, 14,400 v, 3 phase, direct connected
Exciter—One—General Electric Co., 250 v, 190 kw, 3600 rpm, direct connected
Generator Coolers—Four—General Electric Co., internal, 7780 sq ft cooling surface, 700 gpm cooling water
Turbine Oil Coolers—Two—General Electric Co., internal, 450 sq ft
Turbine Oil Filters—One—Bowser, Inc., 540 gph—with storage of 330 gal. storage capacity 3430 gal dirty and 543 gal clean oils

CONDENSING EQUIPMENT

Condenser—One — Ingersoll-Rand Company, horizontal (417-RH-30), two-pass, non-divided, with tilted tube nest; 7712-1" x 29'-11-15/16", #18BWG, 60,000 sq ft, Admiralty metal
Circulating Pumps—Two — Ingersoll-Rand Company, horizontal, centrifugal, (30 ALV), 30,000 gpm each; driven by 700 hp motor, 450 rpm, 2300 v, base ventilated, outdoor, Class "A" insulation
Condensate Pumps—Two — Ingersoll-Rand Company, vertical (APHC-5), turbine, 1300 gpm; driven by vertical hollow-shaft 200 hp motors, 1800 rpm, 2300 v
Air Removal Equipment—Ingersoll-Rand Company, twin element two stage air ejector, mounted on type SIA-53 inter and after condensers
Priming Ejectors—Ingersoll-Rand Company, elbow type, #866
Cooling Tower—Marley Company, type #8-2445 double flow, induced draft, model #K2, 60,000 gpm water @ 103.5 F and 86.5 F w/75 F dry bulb and drift loss less than 0.2%

BOILERS AND EQUIPMENT

Boilers—One—Babcock & Wilcox Co., 2 drum Stirling, pressurized furnace, 36,314 sq ft heating surface; 630,000 lb/hr capacity, 1050 psi design, 950 psi operating. Steam drums 60" x 45' x 2-15/16 and 4-13/16" thickness; mud drums 42" x 48' x 3-5/16" thickness; metal casing, painted
Superheaters—One, pendant, convection, 13,720 sq ft, 910 F
Furnaces—Firing—natural gas, fuel oil and PC future; 9,309 sq ft heating surface
Air Heaters—One—Babcock & Wilcox Co., 2 section tubular; 123,400 sq ft heating surface; 109,000 cfm, 100 F inlet, 545 F outlet
Blow-Off Valves—Two Sets—Edward, 2½ welded, 7541Y-F8
Safety Valves—Two—Diamond #1550 (Bicolor)
Water Columns—Three — Consolidated Mariflow — CS, 3"
Boiler Blow-Off Tanks—One — Boardman Company, from BS&B, 4'6" ID x 9'

FUEL BURNING EQUIPMENT

Burners—Nine—Babcock & Wilcox Co., register (ring), 822,000 cfh
Fuel Oil Pumps—Two—Quimby, 27,500 lb/hr
Fuel Oil Heaters—One — Griscom-Russell, style H 6 pass, 55,000 lb/hr 200 psi
Gas Pressure Regulators—Two—Fisher, 150 lb to 50 lb
One—Bailey, 50 lb to 30 lb
Combustion Control—Bailey Meter Company

DRAFT EQUIPMENT

Stacks—One—Boardman Company, gunnite-lined, 10'6" diameter; 68' high; erected by Oklahoma Gas & Electric Co. Construction Dept.
Smoke Breeching—Boardman Company
Forced Draft Fans—Two—American Blower Company, 109,000 cfm, 21.0" H_2O at 125 F (based on PC future); driven by 600 hp electric motor, 900 rpm
Air Ducts—Boardman Company
Draft Gages—Bailey Meter Company

BOILER FEEDWATER EQUIPMENT

Boiler Feed Pumps—Two — Ingersoll-Rand Company, 6CHTB-5, 5 stage, horizontal multi-stage, single suction impeller, diffuser type (barrel); 755,000 lb/hr, 1235 psi head; 3575 rpm; driven by 1750 hp motor, 3600 rpm, 2300 v
Bleeder Heaters—Three — Griscom-Russell; one 31-6-175 style SSU vertical U tube; one 32-175 style SSU vertical U tube; one 31-288 style LSU vertical U tube
Deaerating Heaters—One—Elliott Company, direct contact, spray type, 700,000 lb/hr capacity
Feedwater Regulators—One—Bailey Meter Company
Evaporator—One—Foster Wheeler, 22,000 lb/hr type TWU-60-6H-719
Make-up Pumps—Two — Ingersoll-Rand Company, type 3-RVH-15, 300 gpm, motor driven

WATER TREATING PLANT EQUIPMENT

Filters—Two—Infilco, pressure type, 116 gpm.
Softening Plant—Infilco, H_2 and sodium zeolite, 88 gpm

PIPE AND PIPE COVERING

Piping Contractor—Fabricator—Pittsburgh Piping & Equipment Company
Steam Header—A-315
Check Valves—Chapman
Gate Valves—Walworth
Globe Valves—Edwards
Pressure-Reducing Valves—Fisher
Small Valves—Hancock
Reverse Flow Valves—Atwood Morill
Automatic Relief Valves—Manning, Maxwell & Moore
Float Chambers and Floats—Fisher
Pipe Covering Contractor—Armstrong Cork Company
Pipe Covering Material—Keasbey & Mattison Co., Hy-Temp & Magnesia combination

INSTRUMENTS

Boiler Meters—One—Bailey Meter Company
Feedwater Flow Meters—Three — Bailey Meter Company, flow nozzles—2 recirculation control; 1 BF Disch
Draft Gages—Eight—Bailey Meter Company
Pressure Gages:
Indicating—Ashcroft — Manning, Maxwell & Moore
Recording—Bailey Meter Company
Vacuum Gages:
Indicating—Ashcroft — Manning, Maxwell & Moore
Recording—Bailey Meter Company
Mercury Columns—American — Manning, Maxwell & Moore
Thermometers:
Indicating—Weston Electrical Instrument Corp.
Recording—Bailey Meter Company
Condensate Conductivity Recorder—Leeds & Northrup
Barometer—American — Manning, Maxwell & Moore
Plant Water Meter—Worthington Corp.

ELECTRICAL EQUIPMENT

Main Transformer—One—General Electric Co., 82500 kva, 13.8/69 kv, 3 phase, type FOA, forced oil, forced air cooled
Standby Auxiliary Transformer—One—General Electric Co.
Auxiliary Transformers—General Electric Co.
Oil Circuit Breakers and Disconnect Switches—General Electric Co.
Grounding Switches and Choke Coils—General Electric Co.
Direct Current Control Power—Gould storage battery, 480 amp/hr
Battery Charger—Electric Products Co., MG set, 10 kw
Switchboard and Control Panels—General Electric Co.

MISCELLANEOUS

Fire Pumps—One—Ingersoll-Rand Company
Air Compressors—Ingersoll-Rand Company, type ES1, 10" x 11", 220 cfm, motor driven
Turbine Room Crane—Colby
Auto-Transformer—General Electric Co., 41,667 kva, 138/69-2.4 kv, 3 10,000 kva, OA/FA, forced air cooled, self-cooled rating 60% of FA rating

except to change burners and connect slag tanks to the bottom of the furnace.

The turbine generator is placed on the open operating deck, and is provided with walk-in shelters on both the governor and exciter ends. It is a General Electric 66 MW preferred standard tandem compound, double flow turbine driving a 70,588 kva hydrogen cooled generator operating at 3600 rpm. The unit is arranged lengthwise with the boiler and with the governor end close to the

STANDARD

The standard YARWAY Impulse Steam Trap serves all normal trapping requirements. Factory set to operate without adjustment at all pressures from 20 psi to 400 psi (Series 60) and 600 psi (Series 120). For pressures below 20 psi, merely remove split washer.

Numerous advantages like:

small size
quick heating
steady temperatures
stainless steel construction
one moving part
non-freezing
low cost

More than 900,000 used throughout industry.

Write for YARWAY Bulletin T-1740.

which impulse for you?

HIGH PRESSURE, INTEGRAL STRAINER

YARWAY Integral Strainer High Pressure Impulse Steam Traps operate on some of the highest pressure steam lines in the country. Same operating principle as the standard YARWAY Impulse Trap. Strainer built into trap.

Ample capacity when system is being "warmed up"—yet will handle relatively small amounts of high temperature condensate without losing prime. Six sizes—½" to 2". Pressures to 1500 psi (flanged ends) or 2500 psi (welding ends).

Write for YARWAY Bulletin T-1740.

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YARWAY

impulse steam traps

YARWAY Impulse Steam Traps and Fine Screen Strainers are stocked and sold by more than 250 convenient local distributors. Write for name of one nearest you.

OG&E's First Outdoor Station (Continued)

control room. The second unit, not contemplated for the immediate future, will be opposite hand and in line so that the present control room will center between the units.

Maintenance of the unit is facilitated by a 35-ton gantry crane straddling the unit. A 10-ton auxiliary hook on an outrigger affords additional reach for light loads. A demountable enclosure of wood panels can be erected over the turbine for shelter during maintenance periods.

Two boiler feed pumps, each with a capacity of 755,000 lb/hr at 1235 psi, take their suction from a deaerating heater which is the third stage of feedwater heating. They discharge through a closed heater to the boiler. Either pump is capable of carrying full station capacity, hence when the second unit is installed it will be necessary to provide only one additional boiler feed pump.

Four stages of feedwater heating are provided. The two lower stage heaters are served in series with the condensate pumps. The deaerator acts as the intermediate pressure heater, and the fourth, or HP heater, is between the boiler feed pump discharge and the boiler.

Two forced draft fans of forward curve blade, slow speed design each have a maximum rating of 120,000 cfm at 21.0 inches of water discharge pressure and 125F. They operate in parallel except at low loads. The fans are located inside the grade elevation building enclosure and under the air heater. Outside air is drawn through a louvered intake and discharged to the air heater where the temperature is raised approximately 450F. The drive is 600 hp, 900 rpm electric motors, and control is on the inlet dampers.

Circulating water is cooled through a range of 17F with an 11.5F approach and wet bulb temperature of 75F over an eight-cell induced draft tower. Two 30,000 gpm horizontal centrifugal pumps, located outdoors, take their suction from a common 72" reinforced concrete pipe from the cooling tower basin, and discharge through the two-pass, 60,000 sq ft condenser to a common reinforced concrete line to the cooling tower.

The tower rests on a reinforced concrete basin carrying a seven-foot level of water storage, thus providing approximately 650,000 gallons, or about twelve hours of operation without makeup. Thus, minor emergencies can be remedied without a station outage.

Generator leads are connected to the 82,500 kva 13.8/69 kv main transformer by isolated phase bus duct. A galvanized steel pull-off structure straddles the transformer to carry the leads to the 66 kv switchyard located approximately 100 feet away. The 66 kv switchyard contains oil circuit breakers as well as a relay and control house. North of the 66 kv switchyard is the 10,000 kva, 138/69/2.9 kv, three-phase, forced air cooled auto-transformer at the terminus of the 138 kv transmission line. The tertiary winding supplying 2.9 kv is a standby emergency power source of station auxiliary power in event the regular 2.4 kv station power transformer is inoperable. The 2.4 kv and 480 V outdoor type switchgear is located outside the building enclosure, and cabled to station equipment through floor trenches. Maximum utilization of trenches and cable pans was made, thus saving considerably the quantity of conduit.

Station piping for outdoor stations presents the problems of adequately protecting the insulation from the elements, and freeze protection. The first was provided by a thin gauge aluminum jacket over the insulation. The jacket gives pleasing appearance and should result in considerable saving in maintenance and painting costs. Freeze protection was accomplished where possible by draining, or by continuous flow.

Soil heating cable, or Teflon covered cable, was applied to those lines which could not otherwise be protected. The cable was looped or wrapped around the outside of the insulation, and under the aluminum jacket.

Control of the circuits is manual, and inspection of circuits is accomplished by test lights mounted on a separate panel in the control room. The cables are supplied separately from the 440 V station power bus, on a balanced wye circuit. Some boiler drains were grouped in an insulated pipe chase down each side of the boiler, and heating cables were hung adjacent to two sides of the chase. Instruments, control valves, and recorders are housed in weatherproof, heated boxes convenient to their equipment. Glass paneled doors give the operator visual inspection without opening the box.

The station was designed by Sargent and Lundy, and built by the Construction Department of OG&E.

Packaged Boilers in Alabama Hospital

(*Starts on page* 61)

testing while checking against actual flue gas analyses and stack temperatures at a large number of check points.

Thereafter during actual operation both fuel and air at any specific firing rate are correctly proportioned for efficient operation with correct CO_2 content and stack temperature of the flue gas.

The boilers are located in the basement boiler room on the far wing. Basically, this is a T-plan hospital with the webs of the T filled in on the lower floors—a standard hospital design. All utilities have been planned for a future 3-story expansion.

The administration of the Druid City Hospital is under the direction of D. O. McClusky, Jr., administrator. Charles H. McCauley was the architect; Daniel Construction Company, general contractor.

Two Terry Turbines equipped with "trouble eliminators"

Because these turbines have solid wheels, they can take a lot of abuse, without complaint. Here's why:

1. The wheel has no separate parts to become loose or work out. It is a single forging, in which a series of semi-circular buckets is milled.

2. Blade wear is of little consequence because the power-producing action of the steam takes place on the curved surfaces at the back of the buckets. Wear does not materially affect horsepower or efficiency.

3. The blades cannot foul. There is a one inch clearance on either side of the wheel and, in addition, the blades are double rim protected. There is no need for close axial blade clearance, because the steam enters the buckets in a direction at right angles to the shaft.

For complete details of these *work horses of industry*, send for a copy of bulletin S-116. No cost or obligation.

THE TERRY STEAM TURBINE CO.

TERRY SQUARE, HARTFORD 1, CONN.

TERRY

TT-1199

People aren't interchangeable . .

SUPERVISOR is the Key Man for RESULTS

ROBERT S. LYNCH, president of the ATLANTIC STEEL COMPANY, and CHARLES E. ATKINS of the WILLIAM S. SCULL CO., Camden, N. J. Mr. Atkins is the retiring president of the NATIONAL COUNCIL OF INDUSTRIAL MANAGEMENT CLUBS.

This material has been adapted from comments by Mr. Lynch before the recent National Conference of Industrial Management Clubs in Atlanta, Georgia.

Help your men develop their capacities . . they will come right back and help you extend yours.

IN THIS age, when machines and technology are equally available to all, the organization that gets ahead of others is always the one that draws better results from men.

Industrial organizations which have shown the most solid growth in our enterprise system are those where management — almost without exception — pays close attention every day to workers as people.

The Effective Supervisor

In the shop, the supervisor performs one of his most important functions in giving personal expression to top management's attitudes. The supervisor, because he has shoulder-to-shoulder contact with his men every hour of the day, has one of the most responsible jobs in all industry in helping management express its human outlook. To express it is a prime part of his own management job.

There was a time when a foreman was picked for his job solely because of his skill with machines, or his technical knowledge. Today, we are equally interested in how a supervisor feels about his people, and gets along with people, and gets fine voluntary response.

The effective supervisor gets his nominal authority by assignment from higher management. But his real power in his department can only be derived from the men he leads—men who yield it to him by their free consent, because he enables each one of them to be a better man and worker through his own leadership.

We have a union today in Atlantic Steel — the United Steel Workers. All of us—both management and plant workers—regard the union organization as a tool of communication between the workmen and the managers at top levels. It is not a barrier between us as people—it is a useful instrument.

N. P. A. Report

All of us feel quite proud of a report published last year by the National Planning Association. It is a Case Study on the Atlantic Steel Company and the United Steelworkers. It was written by two men from the Georgia Institute of Technology, who were sent by the N.P.A. into our plant to study our operations, and to look at us as human beings.

The authors of this report spent very little of their time with management. They went out into the plant, and talked with the rank and file. Here, for instance, was something they noticed about our way of talking at Atlantic.

> "During their two months at the plant, the writers very seldom heard the term 'employees.' Unconsciously, the word 'people' was always used . . . An assistant roller and departmental grievance committee said . . . 'When you say "employee," that draws a line between you and the company. When you say "people," it's like saying *you are* the company. Employees are interchangeable, but people aren't.'"

Here you have in a few words, the whole philosophy on which our constitution, our nation, and our American traditions are based. **People aren't**

Consider the unique K-weld technique...

when critical piping is the order!

View of inside of pipe, showing root bead. Note the highly uniform, crack-free surface obtained through use of K-Weld method.

With today's operating conditions already approaching the limits of available power piping materials, the necessity for expert fabricating techniques cannot be overstressed. And it is here that the K-Weld* process, Kellogg's unique welding method, has already played an important part.

For example, K-Weld was used throughout—both in the shop and in the field—for the welding of austenitic stainless steam piping for service at 1100 F and 2350 psig on two 145,000 Kw units in Kearny Station of Public Service Electric and Gas Co. of New Jersey. It is also being employed in the critical piping for a similar unit at the Company's Burlington Station.

Main advantage of this new welding process lies in the fact that it assures *complete penetration without backing rings*. Their elimination precludes the possibility of crack propagation at the weld root which would produce ultimate failure as a result of severe operating conditions.

An additional advantage is the elimination of the possibility of the backing ring breaking off and damaging equipment. Furthermore the lack of a ring materially reduces turbulence in pipes.

The K-Weld process—developed in Kellogg's Welding and Welding Practices Group—entails the use of inert-gas arc welding of the first pass with inert-gas under *controlled pressure* on the inside of the piping. It permits an average welder qualified for inert-gas arc welding to obtain excellent results either in the field or in the shop. The K-Weld technique may be used on all power piping materials.

Fundamental development work leading to advances in the art of fabrication is an important part of Kellogg's basic stock in trade. Many power station designers and utility companies also say it's one basic reason why they time and again specify Kellogg when critical power piping is the order.

New Power Piping Booklet Published . . . Send for descriptive literature about Kellogg's extensive facilities for assuring the highest quality workmanship. A section of the booklet is devoted to detailed coverage of the K-Weld process.

OTHER FABRICATED PRODUCTS **include:** Pressure Vessels . . . Vacuum Vessels . . . Fractionating Columns . . . Drums and Shells . . . Heat Exchangers . . . Process Piping . . . Heads and Headers . . . Forged and Welded Fittings

These leading companies are among the many major producers of power who use M. W. KELLOGG POWER PIPING . . .

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- Mexican Light & Power Co. (Mexico)
- Monongahela Power Co.
- New York State Electric & Gas Company
- Niagara Mohawk Power Corp.
- Palestine Electric Corp., Ltd. (Israel)
- Philadelphia Electric Co.
- Public Service Co. of Northern Illinois

For further information, details of methods, etc. contact

FABRICATED PRODUCTS DIVISION

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225 Broadway, N. Y. 7, N. Y.

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HIGH PRESSURE

POWER PIPING

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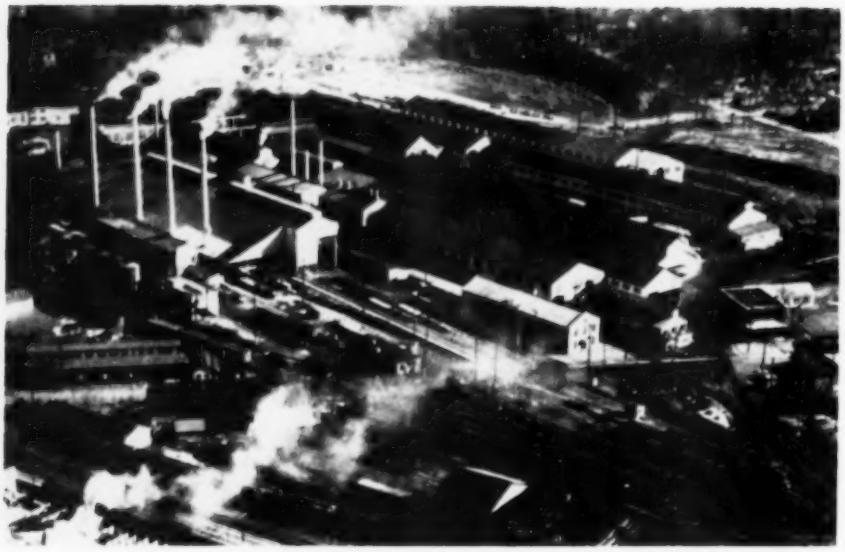
POWER PIPING



OCCUPYING over 200 acres in Atlanta, Georgia, the Atlantic Steel Company has doubled its capacity since 1939 and has increased its output by more than 50% since 1952, when the Southeast's largest electric furnace was placed in operation. Company produces rolled products, wire and a diversified group of manufactured items under the trade name Dixisteel.

interchangeable. Each one of us is an absolutely unique creation, a unique point in space and time. And, if you think that is high flown talk, then let me assure you that it is the most practical outlook in the world—because it works when you apply it to people on the job.

The reporters for the National Planning Association were puzzled, at first, over what seemed a lack of formal or rigid discipline, such as they had found in many other organizations. Then they had their eyes opened. They reported their discovery this way:

> "As the writers became more familiar with the situation, they discovered that what appeared at first to be no discipline at all was actually the most effective variety of all—*self-discipline*. A general foreman explained (to us):
>
> 'These men know what their job is. They know what they're expected to do—how much they have to have ahead to keep the men beyond them supplied. They know when they can leave the job for a few minutes, and when they should be back. They don't just leave—they always tell someone where they're going. I don't believe in requiring that they look busy when they haven't anything to do . . .
>
> 'You let these people know what's expected of them, White or Negro—act like you figured they had sense enough to run the job—and they'll come through for you. When they don't, there's something mighty wrong, and you had better start looking for what it is.'
>
> "This is the usual attitude of the seasoned supervisors at the plant."

In its summary, the N.P.A. report on the relations between us people in Atlantic Steel said simply this: "Labor peace at Atlantic Steel was achieved through means available to free men in free societies everywhere. (It was achieved through) recognition and satisfaction of the elemental and basic needs of people as human beings . . . for response, for recognition, for security, and for new experience.

The supervisor who bears some responsibilities of management is also entitled to enjoy some of the status of management. Higher earnings help a lot in contributing toward the special status that all ambitious men work for in our society. But the "social handle of the paycup"—as it has been called—can be nearly as important to most of us as the money itself. Non-financial extras which go with the supervisor's management position must never be forgotten, in building human morale in a supervisory staff. The supervisor must enjoy, in every possible way, the outward and inward symbol of status in the organization—if he is going to function effectively as a part of the management team. He must **feel** a full-fledged member of that team, before he can **act** as one.

MOST important is the need for a management climate where the supervisor has a role both in making and implementing decisions. In some organizations, union representatives have usurped certain supervisory functions—to the point of displacing the supervisor as a unit in the management chain of communication and command.

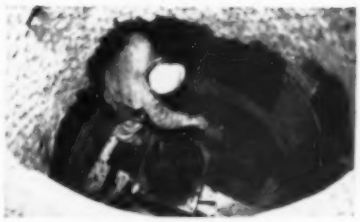
This could never happen when the supervisor enjoys his proper status within the organization—when his job holds true managerial authority and the symbols of that authority—and when his personal character has won for him, from his men, the willing consent to his leadership.

Johns-Manville Insulations save industry a billion dollars in fuel every year!

Reduce your fuel costs and build better furnace linings with JM-3000 INSULATING FIRE BRICK

HERE'S THE ONLY insulating fire brick that withstands a full 3000F. It's highly efficient both as an exposed refractory lining or as back-up insulation. And JM-3000 is only one of six types of Johns-Manville Insulating Fire Brick made for these applications. All provide long-life insulation. All are light in weight, have low conductivity, high structural strength. These properties permit thinner furnace walls—yet you can achieve important fuel savings and increased production, because J-M Insulating Fire Brick assures quick furnace response.

Sil-O-Cel* Insulating Brick is another outstanding J-M fuel-saver . . . a high load-bearing brick for back-up insulation behind refractory linings. It comes in three types, for service through 2500F—makes it possible to reduce the necessary thickness of refractory linings as much as one-third.



Save fuel with J-M Hydraulic Setting Refractories

Johns-Manville refractories meet every need for castable, troweling and gunning applications for temperatures through 3000F. *Firecrete** is used to cast special shapes of all kinds. It is ready for use within 24 hours, has negligible shrinkage and high resistance to spalling. *Blazecrete** is used to build and repair furnace linings. When gunned, it adheres readily with a minimum of rebound loss. When slap-troweled, it eliminates laborious ramming and tamping.

Save Fuel with J-M Aggregates and Fills

These lightweight insulations are used as fills to conserve heat in irregular spaces where other forms of insulations cannot be economically applied. They are also used as aggregates for mixing with other materials to form insulating refractory concrete.

*Reg. U. S. Pat. Off.

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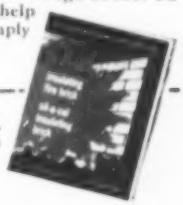

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Chicago Pneumatic's Texas Plant

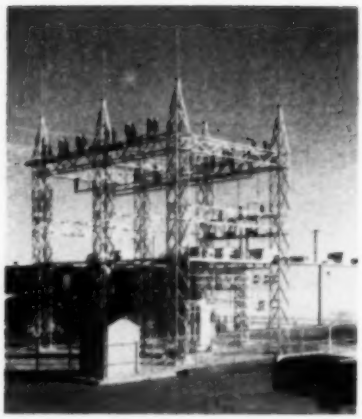
Design highlight report features electrical distribution, lighting, mechanical ventilating and materials handling.

INCORPORATING engineered facilities that make it an outstanding installation for its type and size, Chicago Pneumatic Tool Company's new $4,500,000 plant in Fort Worth, Texas, is in full production on a complete line of oil well drilling equipment for the petroleum industry. Plant consists of three attached buildings: a 200 x 600 ft manufacturing building; a 35 x 200 ft office building; and a cafeteria. Plant was designed and constructed by Walter Kidde Constructors, Inc.

Power Distribution

Maximum utility for current and future growth needs at minimum cost have been obtained with the electrical system. Outstanding features include load-center distribution, unit substations, high voltage distribution, plug-in bus duct and high voltage lighting.

Power for the 3-phase, 480 volt plant distribution system is obtained from four indoor General Electric load center type substations. Two, side by side, serve the concentrated loads of the welding and heat-treating departments; the other two serve the general manufacturing area. In anticipation of future growth in power requirements, there is reserve capacity to meet a 70% increase in the present load.



OUTDOOR switch rack is equipped with four fused air-brake switches and has two spare positions for future switches. Substation is a single 5,000 kva transformer. Dual 60,000 volt lines supply ample, reliable power.

The two side-by-side substations are tied together on the secondary side so that one can carry the essential loads of both should there be a feeder or transformer failure.

Although the other two substations are not tied together, reliability and flexibility are provided.

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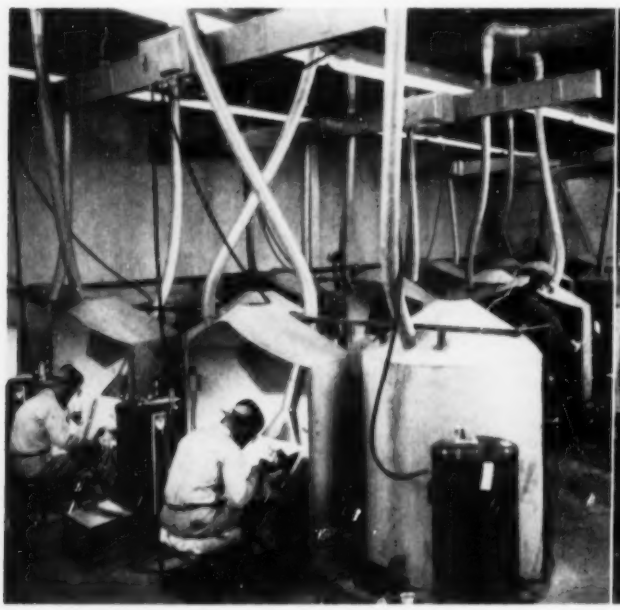

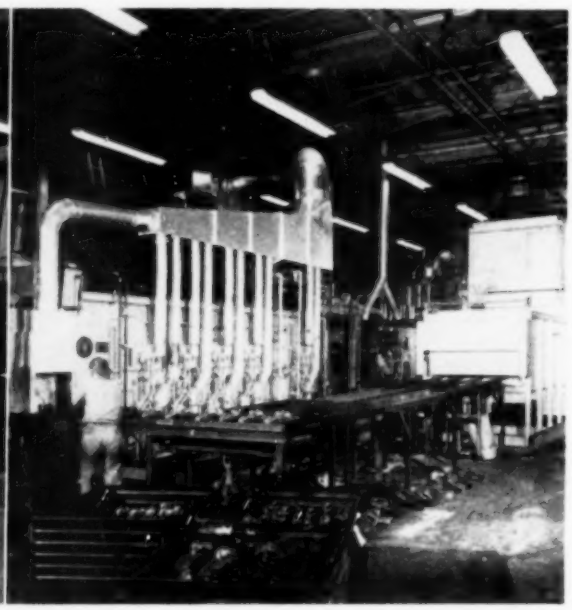

AIR CONDITIONING system with a capacity of 11,400 cfm at a supply temperature of 54 degrees serves the numerous welding (hard facing) booths. For cooling economy, exhaust ducts in each booth remove a large portion of the heat right at the source. These units exhaust air to an 8700 cfm central fan discharging to the outside.

HEAT TREATING area (right) has high heat load and is isolated from the general factory area and provided with an independent supply and exhaust system.

◀ Heat-treating and physical testing equipment shown at left is used for quality control of welding operators and for development of new welding procedures.

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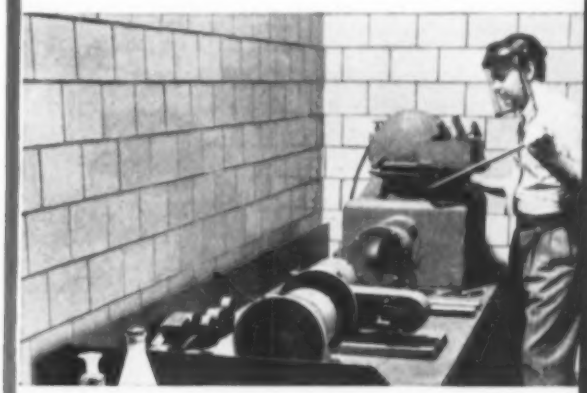
At Navco, a continuous parade of weld specimens are processed in the new, modern physical-chemical testing laboratory. It is here that weldments are studied metallographically and tested physically—all on a rigid schedule of quality control practices. Navco customers have benefited from progressive quality control practices for more than 40 years; they have come to know that piping installations, engineered, fabricated and erected by Navco, are precise, accurate and dependable.

Call on NAVCO for your next piping job.

▲ This Rockwell hardness testing machine measures the hardness of weld specimens as a guide to proper procedures for heat-treating of welds.



▲ A laboratory technician cuts a sample from a pipe weld prior to grinding and polishing for metallographic examination.

▲ Here a weld specimen is etched to outline the grain structure for further metallographic study.

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Chicago Pneumatic's Fort Worth Plant

(Continued)

FACTORY FLOOR is a "floated" reinforced concrete slab finished with 3" thick edge grain wood block laid in asphalt.

The 277 volt lighting system reduces the number of required branch circuit wiring and panel boards and eliminates the need for transformers to step-down the voltage. Continuous-row channel type system (Westinghouse), with magnetic contactors and push button controls, affords light level in the shop area of 30 foot-candles.

Plug-in bus duct sectionalizing devices permit a load to be shifted from one substation to the other.

Plug-in bus duct (Westinghouse) supplies 480 volt power to the entire manufacturing area for production equipment, for a number of transformers required for miscellaneous 120 volt power, and for the lighting system.

Lighting System

A 277 volt lighting system was selected in line with the design criteria of low initial cost and low operating costs. The system reduces the number of required branch circuit wiring and panel boards and eliminates the need for transformers to step-down the voltage.

The lighting system (Westinghouse) is of the continuous-row channel type, with magnetic contactors and push button controls. Light level in the shop area is 30 foot-candles, and there is a provision for additional light fixtures should it prove desirable to raise the light intensity.

Tailored Air Conditioning

The office building as a whole is served by a multizone air conditioning system that provides six zones, each having individual temperature control. Air conditioning equipment is centralized in a sound-treated equipment room, and all machinery was provided with sound isolating mountings.

Cafeteria, offices, and laboratories in the factory, because of their relatively smaller area, are each provided with individual self-contained air conditioning units.

Because of the size and the heavy internal load of the general factory area, it was not economically feasible to provide general air conditioning. However, to assure comfortable working conditions, a ventilation rate of one air change per minute is provided.

Ventilation air is supplied by Acme Fan Co. roof fans and projected through adjustable diffusers at a relative high velocity, so as to cover a wide area at the occupancy level. Air is exhausted through Swartwout gravity ventilators installed next to the supply fans in the roof. With the system, it is possible to ventilate any part of the factory area, independent of the other areas.

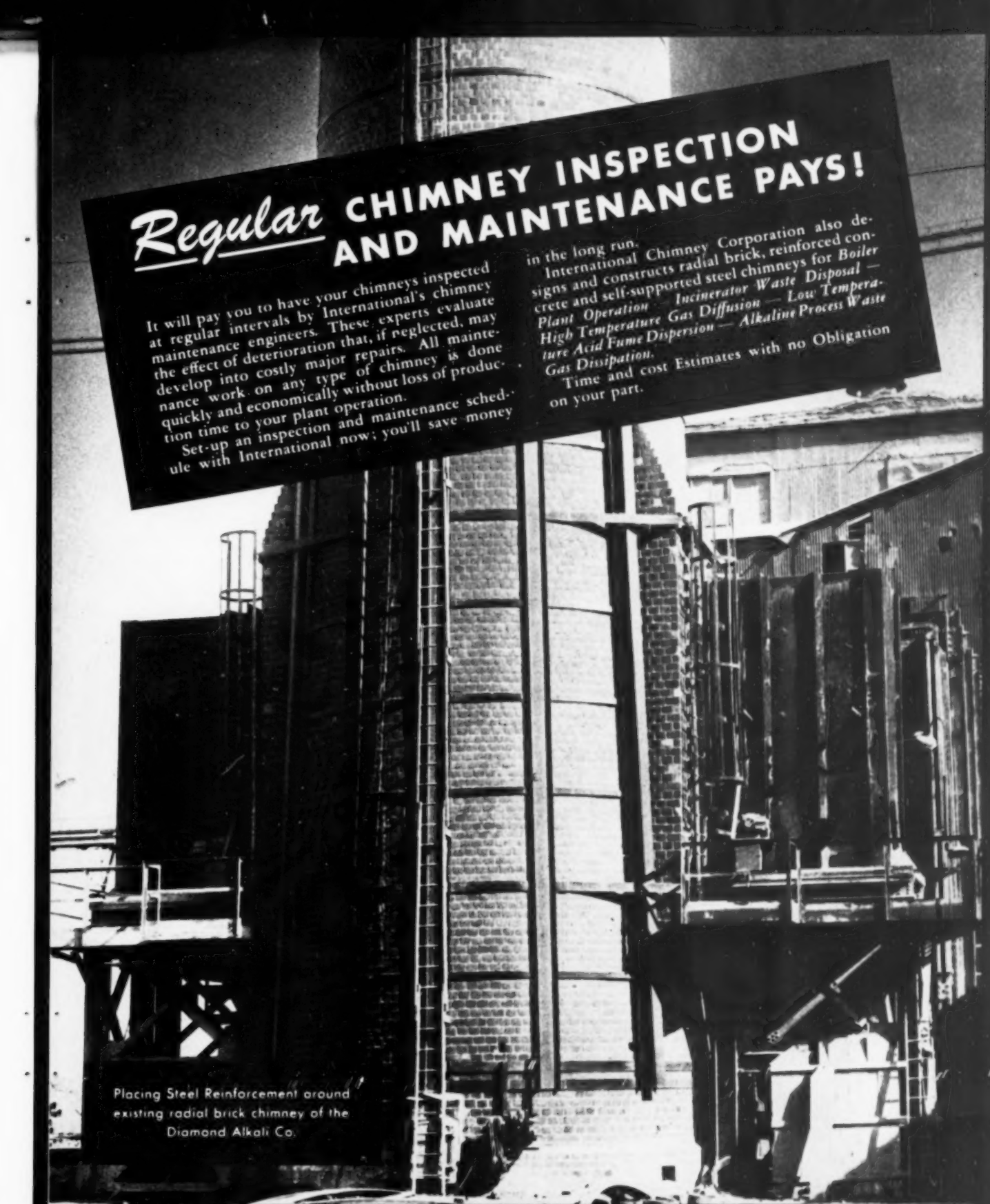
Because of the high heat load in the heat treating area, it was isolated from the general factory area and provided with an independent supply and exhaust system.

An air conditioning system with a capacity of 11,400 cfm at a supply temperature of 54 degrees serves the numerous welding (hard facing) booths, where the heat would otherwise be unbearably high. Two Freon 12 compressor-condenser units are in an adjacent room. For cooling economy, exhaust ducts in each hard facing booth remove a large portion of the heat right at the source. These units exhaust air to an 8700 cfm central fan discharging to the outside.

This area, like the rest of the plant, has the roof covered with 1" of water to reduce the cooling load.

Materials Handling

All crane bridges, trolleys, and hoists in the Fort Worth, Texas, plant were furnished by Louden Machinery Company. One 5 ton crane in the west bay of the plant handles material from storage through the first stage of manufacture. Four 2 ton cranes serve service shop and manufacturing area and another 1¼ ton crane (oval shape) serves a chipveyor system. Crane girders are supported from roof beams 2' from "L" of columns. Clearance from floor to hook is 14' 5" on the 2 ton cranes and 14' 11" on the 5 ton crane.



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Power transmission fundamentals for the plant engineer . .

Hydraulic Variable Speed Drives

Discussion features positive drives (incorporating radial or parallel pistons) and variable-speed fluid couplings.

Comments by JOHN E. HYLER

PRINCIPAL value of hydraulic power transmission is the facility with which it provides for variable-speed.

Hydraulic variable speed drives of the positive type may be subdivided into two general kinds: radial-piston and the axial-piston or parallel-piston type. In the first case, pistons are radially disposed around the axis of the unit, in the sense that their stroke is radial. In the other case, all incorporated pistons have their stroke parallel with the axis of the unit.

Whether the design incorporates radial or axial pistons, a positive hydraulic variable speed mechanism is made up of two major components, namely a hydraulic pump and a hydraulic motor. Sometimes the two units are in a single case or housing, with means for driving the hydraulic motor through the hydraulic pump. The input shaft (usually but not always of constant speed) drives the hydraulic pump, which in turn drives the hydraulic motor. The variable-speed output shaft is made a component of the hydraulic motor.

On this basis, three different methods are available for obtaining variable speed on an output shaft from a constant-speed input shaft.

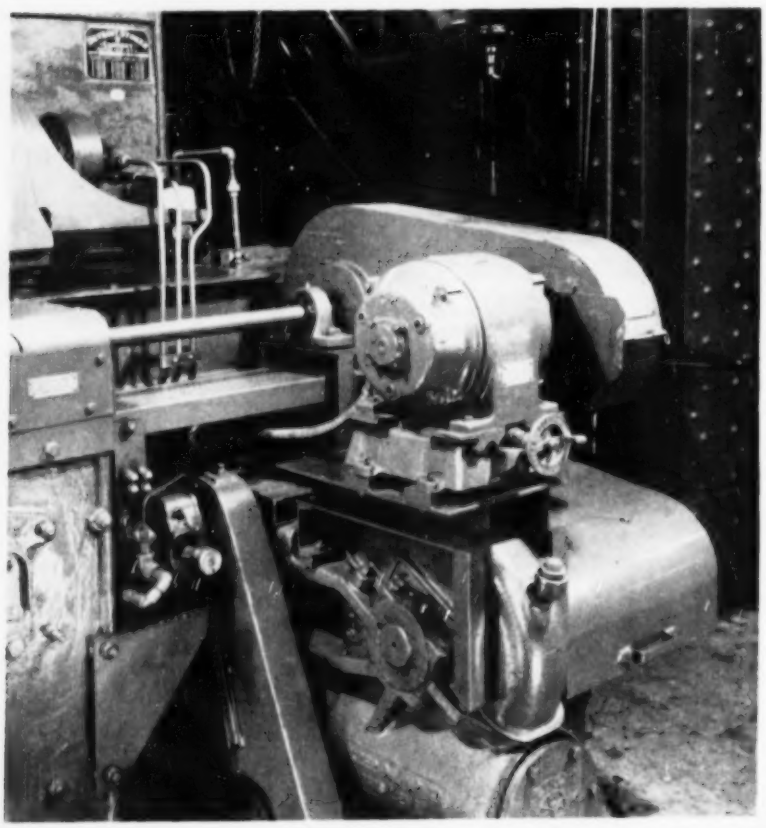
1. Employ a variable-displacement pump to drive a constant-displacement motor.

2. Arrangement may be reversed, using a constant-displacement pump to drive a variable-displacement motor.

3. Both pump and motor may be of the variable-displacement type, if desired.

All three methods have been used. Pump and motor are usually quite similar in design.

Speed control may be manual or automatic. Automatic control



THIS STOKER installation is provided with two variable-delivery radial-piston hydraulic pumps, which have simple diaphragm-actuated, hydraulic servo-motor lever controls, supplying fluid power for the fuel feed and the grate drives.

Drive being actuated in this manner causes fuel-feed rate and grate speed to accompany steam demand up and down. Recording charts in this installation show that steam demand varies tremendously, but steam pressure and fuel-air ratio remain steady. Photo courtesy Oilgear Company.

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*CB — Carbon Black (U. S. Patents 2,102,129, 2,405,853) Reg. U. S. Pat. Off.

**F-3—Arsenic-Lead Alloy (U. S. Patents 2,300,788, 2,375,755, 2,504,600 and 2,570,501) Reg. U. S. Pat. Off.

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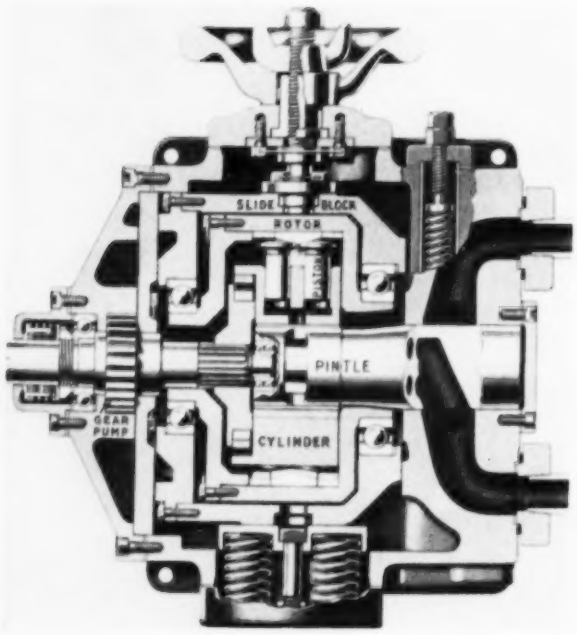
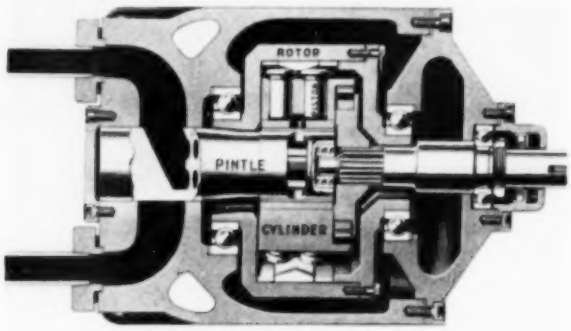


HYDRAULIC variable speed drives of the radial-piston type may have their pump and motor in the same case, or the two units may be separate, with oil pumped from one to the other. Here is a plan sectional view of a variable-displacement pump of this kind.

Note the handwheel screw control consists of a large screw flanged to the slide block, a long working nut, a handwheel, and a lock nut. This handwheel provides accurate control of slide block position, and therefore over volume of oil displaced.

Note the pair of heavy compression springs opposite the handwheel control. They function to hold the slide block firmly against the control mechanism at all times.

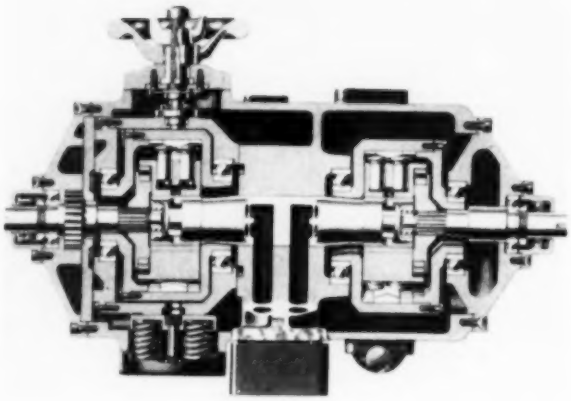


CONSTANT-DISPLACEMENT unit of the radial-piston type will operate either as pump or motor. Here we are assuming it to be a motor used in conjunction with the variable-displacement pump previously mentioned.

Arrangement is the same with regard to pintle, cylinder, rotor and reaction rings, but there is no slide block, and no means for adjustment of eccentricity.

Oil delivered under pressure from the pump to the upper port in this motor pintle will force the pistons over the top port outward, causing the cylinder, rotor and output shaft to revolve clockwise. On the other hand, if oil is delivered from the pump to the lower pintle port, the result will be counterclockwise rotation.

LOWER VIEW shows how the two units may be conveniently placed in a single case to make a compact variable-speed unit, with the input and output shafts in line.



has many interesting aspects. In different cases, different types of servomechanisms have been employed, some of which are relatively simple. One or two of these will be cited, to illustrate versatility of such drives in regard to automatic speed changing, and in keeping with out-of-the-ordinary requirements.

Radial-Piston Pumps and Motors

Hydraulic variable speed drives of radial-piston type may have their pump and motor in the same case, or the two units may be separate, with oil piped from one to the other. A plan sectional view of a variable-displacement pump of this kind is illustrated.

In the center is seen a pintle or cylindrical valve, which is pressed into the case tightly, so it does not revolve. The unit consists of this pintle, a cylinder barrel with seven or more closely-fitted radial pistons, one or more reaction rings, a rotor, and a slide block. The floating-coupling flange seen splined to the righthand end of the input shaft drives the cylinder barrel. Centrifugal force keeps the convex surfaces of the pistons against the concave surface in the reaction ring at all times. The pistons both roll on their axes and reciprocate.

The rotor and the rotor end head (which rotor contains the reaction rings) are mounted in large anti-friction bearings. They also rotate due to action of the rolling pistons against the reaction rings. The complete rotor unit

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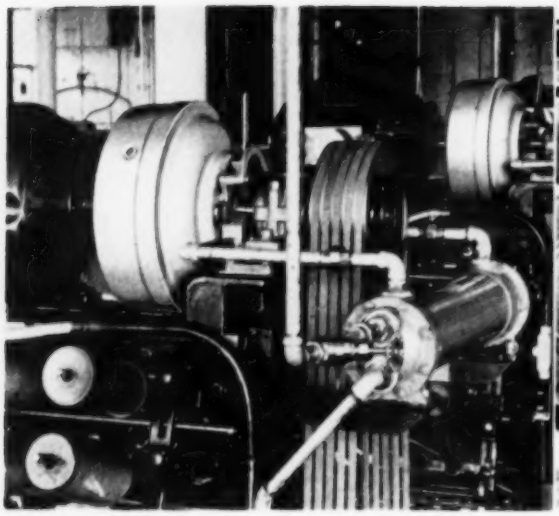
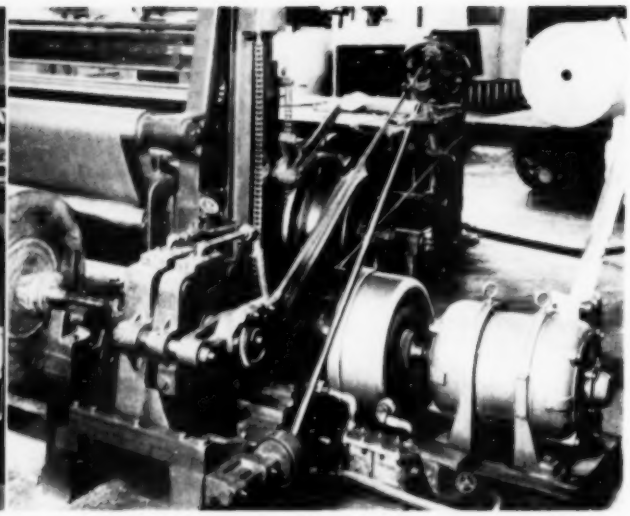




THIS REVERSIBLE variable-speed drive of the fluid-coupling type is used on spinning frames for worsted yarn. Lever for varying speed of the drive can be seen immediately to the right of the fluid coupling.

HYDRAULIC COUPLING of the variable-speed type is used in the drive (photo at right) for a Cameron rewinder rated at 15 hp and 1750 rpm. All winder drives require use of variable speed. Motor is seen at the extreme right, and the fluid drive to its left. Immediately to the left of the fluid drive can be seen the lever (with an extended link) employed for adjusting the internal scoop tube, to vary speed of the drive. Photos courtesy American Blower Corporation.

is mounted in a non-revolving slide block. This slide block is mounted between four horizontal ways in the case, and is connected to the control mechanism (in this case the handwheel and screw seen at the top). It may be adjusted to vary the length of the radial stroke of the pistons, and therefore the amount of fluid displaced by the pump.

A plan view section is also shown of a constant-displacement unit of radial-piston type, which will operate either as pump or motor, but which we are here assuming to be a motor used in conjunction with the variable-displacement pump formerly considered.

The arrangement is the same with regard to pintle, cylinder, rotor and reaction rings, but there is no slide block, and no means for adjustment of eccentricity. The cylinder is strongly eccentric to the rotor, but its degree of eccentricity is fixed. Therefore its displacement is constant.

Parallel-Piston Displacement Units

In parallel-piston types of hydraulic variable speed mechanisms, there are several highly competent designs, which make use of either tilted wobbler discs or tilted socket plates for actuating parallel pistons in their stroke. Means is provided for adjusting the tilt of wobbler discs or socket plates to obtain different piston-stroke values, and consequently, different fluid displacement values.

In these, as in radial piston types, there is a pump and a motor; pump displacement may be variable with motor displacement constant, pump displacement may be constant with motor displacement variable, or displacements of both may be variable. Many of these units are very ingenious and highly efficient.

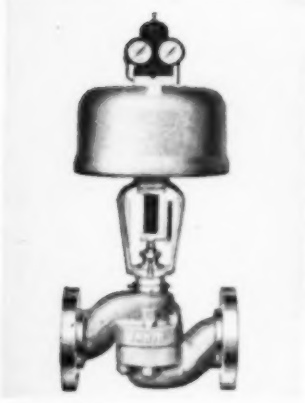
Development of different controlling methods for hydraulic variable speed mechanisms has extended their versatility tremendously. Control through a handwheel has been noted. A worm-wheel control may be arranged instead, which provides much more delicate adjustment on radial-piston units. In some instances, an electric geared-head motor, with reduction on the screw shaft, is used on oneway pumps. It provides accurate and prompt adjustment of oil delivery from zero to maximum by means of push-button stations or limit switches, as seems best adapted to a given situation.

Various other means of control are available. One of outstanding interest is the use of an **auxiliary** hydraulic pump, for making displacement adjustment on a main hydraulic variable-displacement pump, functioning together with a variable-displacement hydraulic motor for delivering variable speed. The auxiliary pump is provided with a servo-motor lever control. The lever may be either manually or automatically operated.

One interesting application of an auxiliary hydraulic pump for speed control in this manner is at a rotary veneer lathe. It is necessary to progressively step up rpm of a log being reduced to veneer, as that log progressively lessens in diameter, to obtain an approximately-uniform surface speed on the log, and therefore approximately-uniform rate of veneer production. In this case, the lever on the auxiliary pump may be actuated by arranging a simple link or lever mechanism from the lathe knife carriage, or from the changing log diameter.

An interesting fact is that a differential mechanism of bevel-gear type may be employed to com-

SEE THEM!



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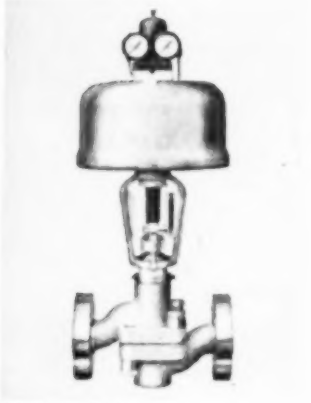
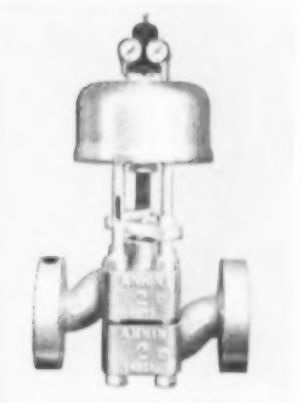
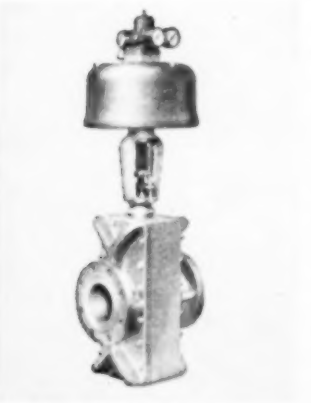
BODY DESIGN – Globe, angle and three-way. Tight shut-off, single seat body. Free-flowing design eliminates erosion. Doolseal, Bellows seal, cooling fin interchangeable with standard bonnet. Optional Teflon guide bushings and Teflon seat seal.
OPERATORS – Domotor, Cylinder and Handwheel. Precise positioning Domotor operators for all pressures and pressure drops. Stroke ranges .005 to 6 inches. Piston sizes of 25, 50, 100, 200 and 400 sq. ins. for thrusts up to 40,000 lbs.



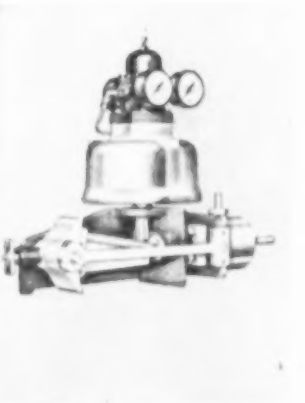
Model 2560



Model 3560



Catalyst Slide Valve



Model 5060

ANNIN Control VALVES

THE ANNIN COMPANY
6570 E. TELEGRAPH ROAD, LOS ANGELES 22, CALIFORNIA

Write today for illustrated catalog 1500 B
You'll profit by learning more about the superior features and better performance of Annin Control Valves

pare speed of the output shaft of a hydraulic variable speed mechanism with some existing reference speed, and to keep one in perfect time with the other, whether the reference speed be constant, or going through any kind of change.

It is a law of differential mechanisms of this kind that when the speeds of the two shafts in line are equal, the middle member of the differential mechanism will have no relative motion in regard to the outer members, but will simply revolve with them. As soon as there is any difference whatever, the middle member **does** have a relative motion. This relative motion, in whichever direction, may be employed for detecting and correcting the speed difference, by making displacement adjustment of the main hydraulic pump or hydraulic motor.

Constant-Speed Output

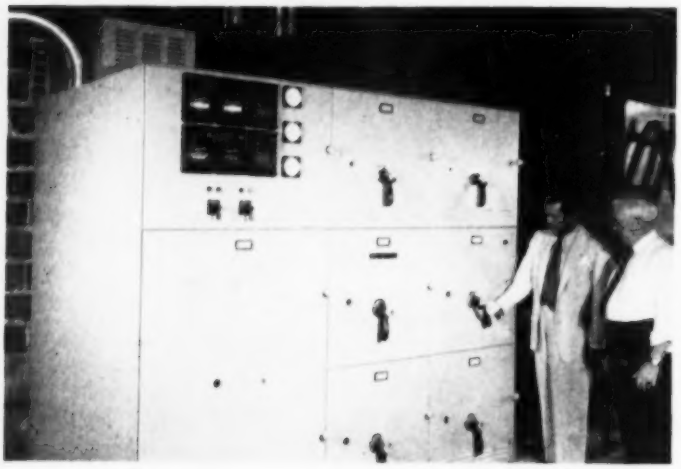
It is very interesting to know that variable-speed practice, in regard to hydraulic variable speed devices of certain parallel-piston designs, may be reversed to advantage. Whereas usual practice has to do with deriving variable speed from a constant-speed source, it is nevertheless possible to derive a given constant speed from a variable-speed source.

One instance of this is where it is necessary to derive given constant speed from a variable-speed aircraft engine for driving an alternator of aircraft type. By using a proper type of hydraulic variable-speed device between the alternator and the engine, and then arranging a governor at the output end (which will automatically signal and provide an impulse for increasing or decreasing displacement of either the hydraulic pump or hydraulic motor, as need appears), speed of the alternator drive may be held constant regardless of irregularities in aircraft engine speed.

There are many possible variations of design into which hydraulic variable speed transmissions of this general type may be built. It is the intent of those providing this highly versatile layout to design a hydraulic variable speed mechanism to fit a particular need, and to put it into a housing which meets the need of a specific customer, rather than developing and offering any standard design, since requirements for various customers are found to fluctuate over a wide range.

It is felt that this type of design may be used in a wide number of fields of endeavor, and would be appropriate whether horsepower requirements were as low as 5 or as high as 1,000. In-

(*Continued on page* 122)



Modern Substation Meets Increased Demand

Substation with high tension feeders and metering on high side meets increased electrical demand in Baltimore plant.

AN UNUSUAL type substation was recently installed by the Reid-Avery Company, welding electrode manufacturers of Baltimore, Maryland.

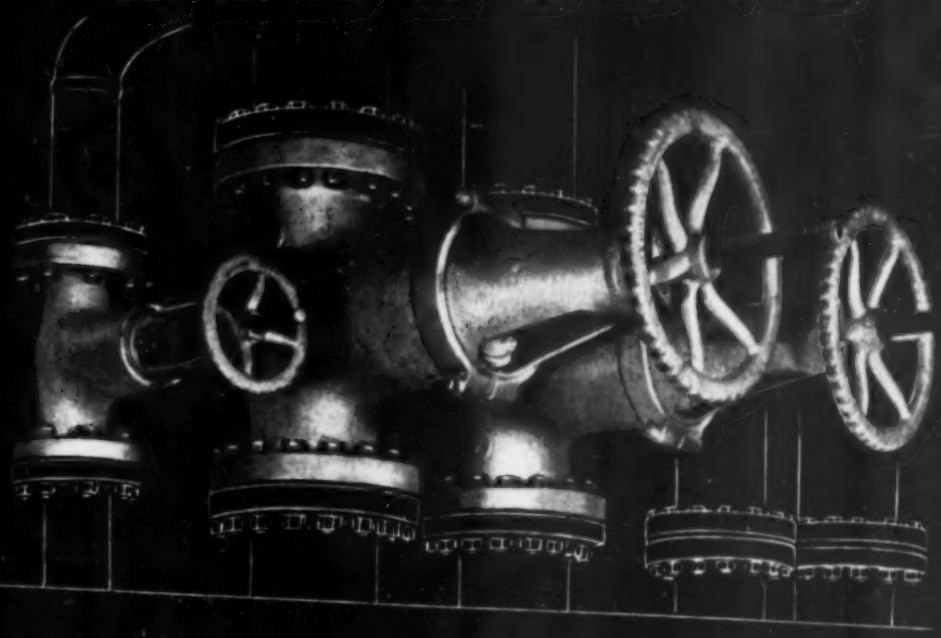
Installation of new machinery and increased production had created an electrical energy demand in excess of the capacity of the low tension service from the Consolidated Gas Electric Light & Power Company. Reid-Avery decided on the installation of a standard General Electric outdoor/indoor unit substation with two new incoming high tension feeders from the power company and plant metering on the high side.

Consolidated's 13.8 kv feeders are terminated on a standard outdoor prefabricated steel structure arranged for strain insulators and lightning arrestors. Selectivity between the two high voltage feeders is provided by two group operated, 600 amp type RF-1 Horn Gap Switches, and circuit protection is provided with a 14.4 kv oil circuit breaker.

General Electric engineers provided for the easy installation of the utility company's metering unit on the high side. Transformation equipment includes an oil immersed self cooled type OA-T1 transformer rated 1000 kva, 13,200/240 volts 3 phase 60 cycle, bus duct connected through a building wall into the indoor metal-clad low voltage switchgear. Indoor feeder units are protected by three 600 amp and three 800 amp type AL-2-50 draw-out type air circuit breakers.

Reid-Avery is now realizing the benefits of better rates available to customers with high tension metering. A minimum of indoor factory floor space is taken up by the installation.

WALWORTH



PRESSURE-SEAL CAST STEEL VALVES

Better because ... **They have no bonnet flanges, bonnet bolts, or bonnet welds. Ideal for high-pressure, high-temperature steam service and corresponding boiler feed service, Walworth Pressure-Seal Cast Steel Valves weigh less, and take up less space than the flanged bonnet type of valves used for similar services.**

These are a few of the important advantages made possible by the design of Walworth *Pressure-Seal* Cast Steel Valves. Internal line pressure is utilized within the bonnet to maintain a tight, leakproof, body-to-bonnet connection under all normal operating conditions. The higher the pressure, the tighter the seal.

Ask for your copy of Walworth Circular 143. It gives detailed information, including sizes, dimensions, and specifications for all Walworth Pressure-Seal Cast Steel Valves.

Cross section of 8-inch Series 900 Walworth Pressure-Seal Cast Steel Gate Valve. Pressure-Seal Globe, Check, Angle, and Non-Return Valves are also available in Series 600, 900, 1500 and 2500 in a wide range of sizes.

WALWORTH

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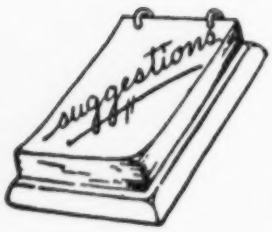
DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD



HELPING the *MAN-IN-THE-PLANT*

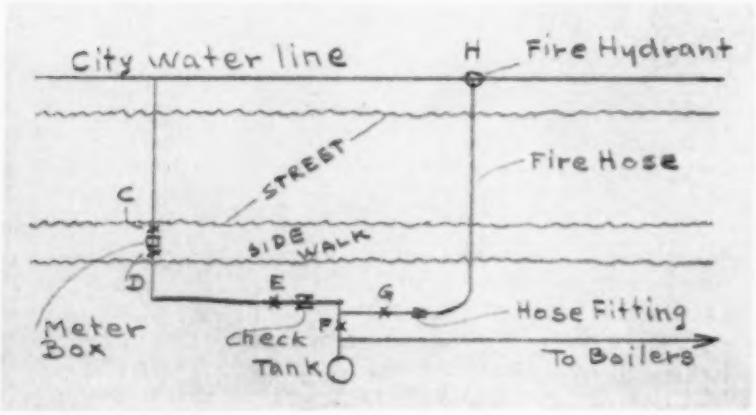
Ideas . . Methods . . Gadgets

Power Tools Pay Off

IN THE Anderson, S. C., cotton mill of Abney Mills, Inc., the present maintenance crew can accomplish with four Ingersoll-Rand electric Impactools what it would take an additional staff of 4 men to do, working with hand tools. That is, each Impactool is worth an extra man on the Maintenance staff, according to the Master Mechanic, Joe L. Burriss.

Jobs that formerly required two men are now done by one man—and in less time, with less physical effort. A few jobs done with the power tools are (1) thread tapping, (2) installing electric conduits in the plant, (3) nut running on electric motors; (4) making wood products in the carpenter shop, (5) repair of machinery, (6) modernization of machinery, (7) installation of machinery.

The plant has two sizes, Size 4U, rated up to $\frac{3}{8}$" bolt capacity; and Size 8U, rated up to $\frac{5}{8}$" bolt capacity. Each unit is equipped with drills, taps, extension sockets, and universal sockets to make it a multi-purpose tool. Result: Speeded mill maintenance, reduced costs, and less fatigue for the workers.



Fire Hose Feed Line

THE accompanying sketch shows a plan we used at our steam plant when it became necessary to make repairs to a 4 in. compound city water meter that had been installed without a by-pass. The meter box was located in the center of a cement sidewalk. The meter box was evidently built around the meter after it was installed.

We use city water for boiler make-up and the supply could not be interrupted for over a two hour period. Rather than take any chances, we made a temporary connection in our supply line as shown by the sketch.

We obtained a female standard fire hose connection, and this brass fitting was welded to a piece of size $2\frac{1}{2}$ in. pipe. We installed a $2\frac{1}{2}$ in. valve at "G." A fire hose was connected to the fire hydrant "H" and run across the street to fitting "G." A wooden crossover was built alongside the fire hose to protect it from traffic.

Before we tried out the idea we filled the 5000 gal water tank. After testing out the fire hose we closed valves "C, D and E" and opened valves "G and H." Then work started on the removal of the meter. When water went down in tank we opened valve "F." Then the men found that repairs could not be made on the meter and it would have to be removed. After this was done a pipe was installed in place of the meter and the system was returned to normal operation. When the repaired meter was returned, the fire hose connection was again made to the hydrant to permit installation.

By G. G. Avant, N. C.

Garden spot for **power...**

Four type H-10 Sterling B & W Boilers with steam capacity of 7,500 lbs. per hour. P-D Collectors are mounted behind boilers with the P-D Fan Stacks directly above.

General view of plant from garden-like park surroundings. Note 4 P-D short Fan Stacks.

...kept free from flyash with P-D Dust Collectors

A model power plant, set in a garden, was realized by Cerveceria Modelo, S.A., Cotorro, Cuba. This company, a part of the Bacardi interests, determined to maintain a garden-like atmosphere surrounding the plant.

Although boilers are completely automatic, Prat-Daniel design 6HC horizontal Dust Collectors were installed to collect flue gas residue resulting from oil-firing. P-D Fan Stacks insured adequate, constant draft through boiler and collectors. Capacity of these collectors at 580°F. is 4860 CFM at 1.75 in WG resistance.

Your plant can enjoy garden-like surroundings, kept free of dust, with P-D Collectors. Why not contact our project engineer today?

Project Engineers

THE THERMIX CORPORATION

GREENWICH, CONN.

(Offices in 38 Principal Cities)

Designers and Manufacturers *Canadian Affiliates:* T. C. CHOWN, LTD., Montreal 25, Quebec; Toronto 5, Ontario PDC 154.1

PRAT-DANIEL CORPORATION

SOUTH NORWALK, CONN.

POWER DIVISION: Tubular Dust Collectors, Forced Draft Fans, Air Preheaters, Induced Draft Fans, Fan Stacks

Repairing Cracked Milling Cutters Routine Maintenance in Texas Plant

IN Dallas, Texas, Temco Aircraft Corporation is putting cracked milling cutters back in operation the same day they are damaged.

The firm has found that major repair on these high carbon tools can be a routine maintenance operation. The only requirements are these: a few special fixtures, correct welding equipment and an above-average welder.

Savings from a cutter repair program are great, since milling cutters, which range in price from $30 to several hundred dollars, normally are scrapped after damage.

Cutter cracks at Temco usually result from milling machines feeding too fast, or biting too deep. In cases where matched cutters were used in pairs, a perfectly sound cutter had to be discarded if its twin was damaged.

Repair Method

Temco's cracked cutters now are routed to Maintenance Department Welder William P. Alberts.

Alberts first fits together the two pieces of a broken circular cutter on a simple fixture he made of surface-ground boiler plate. This fixture merely serves as a level platform on which broken cutter pieces can be reassembled accurately.

When fit and alignment are perfect, Alberts secures the pieces with C-clamps and tacks them in two places with an electric arc, using a No. 680 Electrode, a high alloy, tool steel product made by Eutectic Welding Alloys Corp.

This joins the pieces sufficiently so that the complete cutter can be placed on a 7-by-¼-inch Carborundum wheel. Alberts grinds a deep groove along the crack, first on one side of the cutter, then on the other. The groove allows Alberts to get as close to a 100% weld as possible.

Tacked and grooved, the cutter is placed in another fixture for pre-heating and welding. This device consists of two steel rings, cut from 10-inch ID pipe. The cutter is placed between the rings which are tightened by means of four ½-by-4-inch bolts. Four smaller bolts, attached to steel cross-pieces in each ring, are screwed tight against the cutter, sandwiched inside, further securing it.

GOOD AS NEW are these milling cutters which were cracked, then repaired by Temco Aircraft Corporation's maintenance department. This difficult welding job has been simplified by Temco by means of practice, a few welding fixtures and proper welding materials.

Alberts pre-heats both fixture and cutter to about 700 degrees. He welds with Eutectic's 680 Electrode and between tacks, he heats the work with a No. 7 tip on an oxygen-acetylene torch.

The welding operation requires about 30 minutes, excluding set-up and pre-heating time. Alberts then normalizes cutter temperature and places the tool, still in its fixture, on edge inside a box to cool.

When cooling is completed and the weld is ground flush with the cutter surface, the tool is ready for service.

READY FOR WELDING is the cracked cutter shown sandwiched inside the welding fixture. Note that a deep groove has been ground along the route of the fracture. Welder William Alberts, shown holding the fixture, grooves the crack in order to get as close to a 100% weld as possible.

AFTER MANY months of experimentation, William Alberts recommends several safeguards against further cracking damaged cutters during welding.

1. Welding from the inside (hub) of the cutter to the outside (cutting edge).

2. Keeping an equal amount of weld on both sides of the groove, and keeping the arc as close as possible to the center of the groove.

3. Getting the torch flame on the work IMMEDIATELY after each tack is made.

4. Keeping the weld balanced. For example, if the crack runs completely across the cutter, weld briefly at one extremity, then switch to the other. By alternating in this fashion until the weld is complete, one avoids too much "pull" at any one point.

Designed ONLY for the TOUGH JOBS

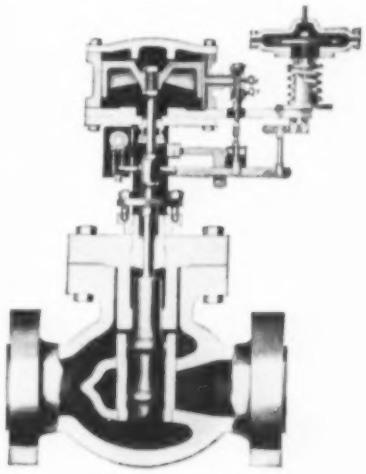
BUILT FOR PERFORMANCE . . . NOT DOWN TO PRICE!

WHEN you select your pressure reducing and desuperheating station, you'll pay more if you buy COPES. But if your job is a tough one, you'll find COPES cheapest in the long run. You'll be money ahead in installation, operation and maintenance costs, and you'll be getting *accurate* control—even down to your lightest loads, not just at your normal flows.

You'll get *quiet* operation—avoiding annoying chatter and destructive vibration.

You'll get 'round-the-clock dependability for years to come—with any adjustments or maintenance easily handled by your plant personnel.

It all adds up to the kind of performance you need for your tough jobs—results you cannot expect if you buy on price.



COPES-VULCAN DIVISION
CONTINENTAL FOUNDRY & MACHINE COMPANY
ERIE, PENNSYLVANIA

The COPES DESUPERHEATER

You'll find it easy to install the self-contained COPES Desuperheater. It goes into the line as a unit, with only three connections. All accessories are furnished. You need no extra steam atomizing valve with extra stop valves—no long run of alloy-steel steam piping—no extra piping from the temperature element to the spray nozzle—no other extras.

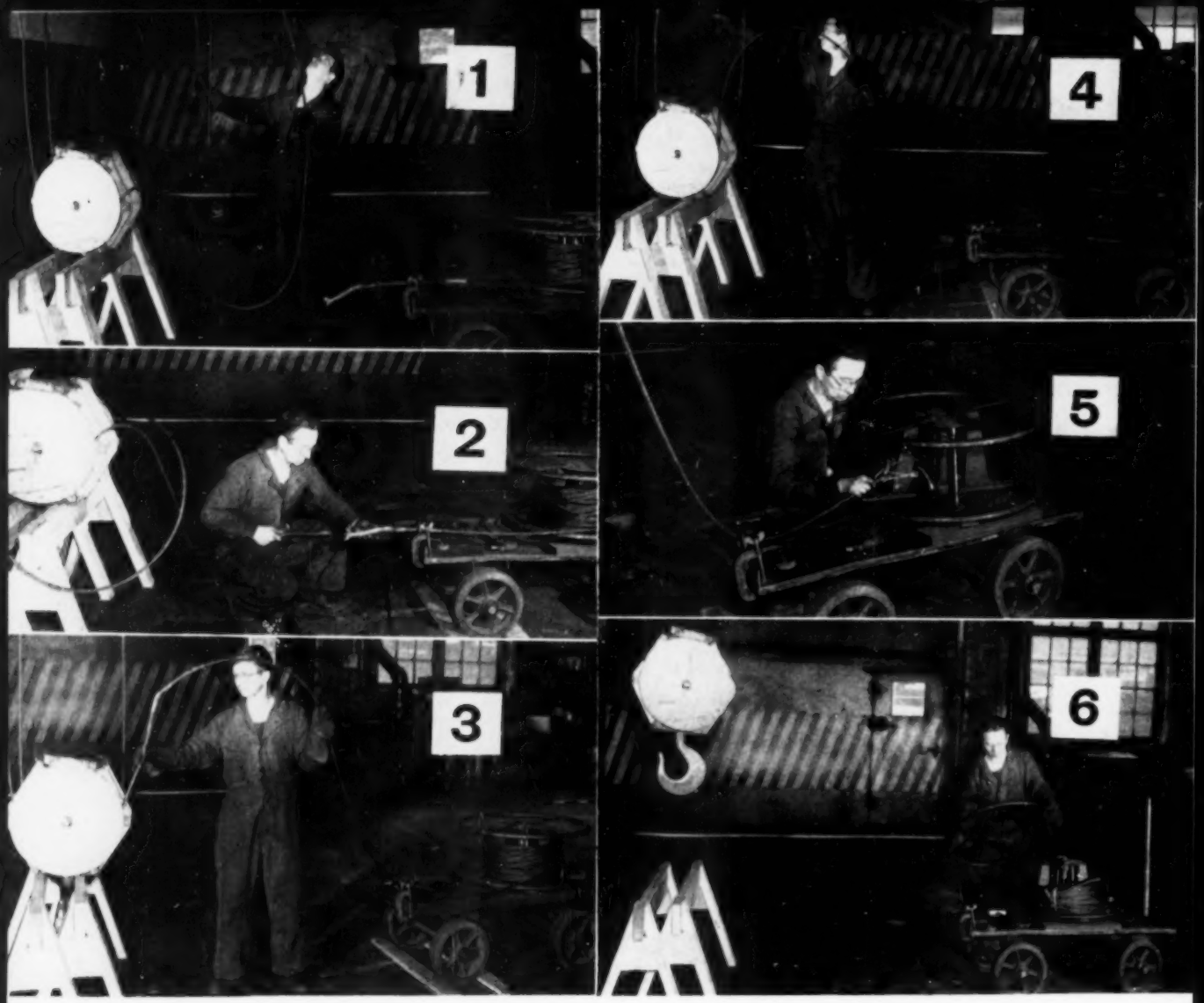
You'll also find your COPES Desuperheater correctly sized for low velocities—for minimum noise, vibration and wear. You'll find temperature control accurate—even on lightest flows—because cooling water is controlled and completely atomized inside the mixing chamber. Adjustment is simple and permanent.

The COPES REDUCING VALVE

You'll find your COPES valve ports accurately designed for the correct capacities under the flow and pressure conditions you specify. You'll have no "hunting" to upset the precision of your control.

You'll find extra-heavy construction throughout. The valve piston is supported and guided in the areas subject to greatest velocities and forces. If these forces could cause excessive erosion, Stellite is welded to all contact surfaces before they are precision-ground to correct clearance for your installation. You'll find design and construction minimizes the possibility of sticking, leaking or vibrating. You'll suffer no objectionable noise.

ENGINEERED BY THE MAKERS OF COPES FEED WATER REGULATORS



How to Replace a Crane Cable

THIS SIMPLE method, developed by P&H, makes it possible to effect the complete replacement of a crane cable with just three men, during a lunch period. Although the above pictures show an auxiliary block with 4-part reeving to illustrate the method, large blocks with 12-part reeving are handled quite as easily.

Courtesy Harnischfeger Corporation

STEP 1—First the bottom block is lowered onto horses or other support to hold it in an upright position. Then man on floor connects ends of old and new cable by means of braided wire splicer which locks in pulling, like the old familiar Japanese finger traps.

STEP 2—Coil of new cable is slipped over hub of cable-changing reel which has removable top flange or ring. One man operates crane, rotating drum until all old cable is unwound. Second man disconnects cable **from one end of drum,** lowering end by hand-line to third man on floor.

STEP 3—Crane operator now winds up old cable slowly, the new cable following through all sheaves, equalizers, etc.

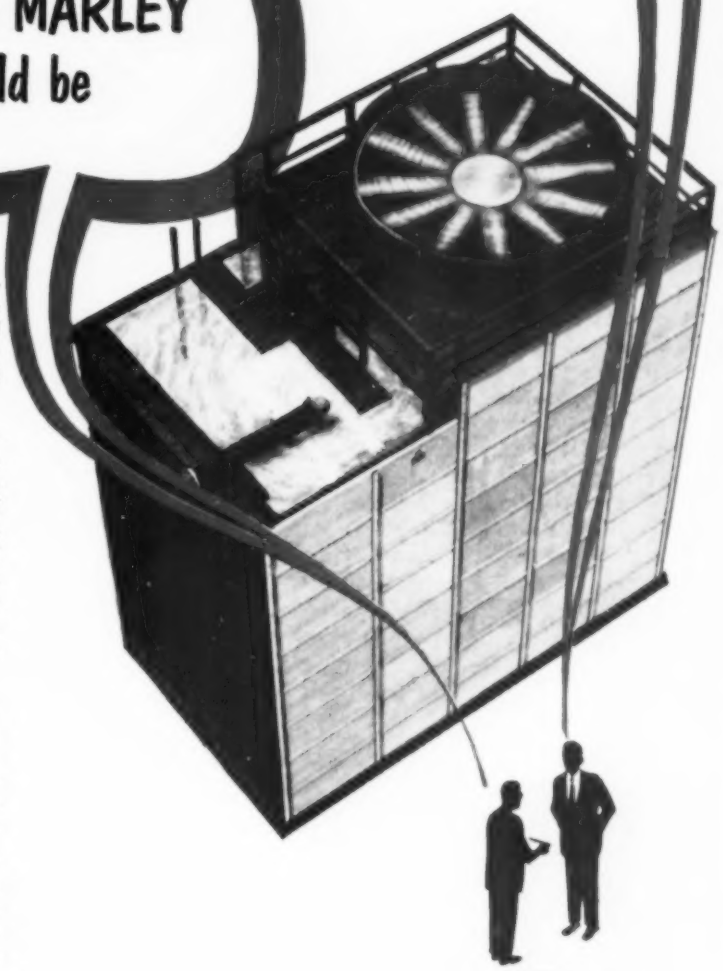
STEP 4—Note union of old and new cables after passing through bottom block on way to drum. After old cable is completely wound up, man at drum disconnects new cable, and temporarily fastens end.

STEP 5—End of old cable is now lowered and attached to changing reel which is turned by hand, taking up old cable.

STEP 6—When all old cable is on the changing reel, it is tied and the coil is removed. Both ends of the new cable are now attached to the drum—and the job is done.

What's the temperature of the basin water?

84°— just what MARLEY said it would be



Thermal control dictates the economy of every process operation, and the key to control is cold water — delivered consistently at design specification. Every Marley cooling tower offered today will produce that optimum result.

Built into every Marley tower is the pre-tested performance ability to do its specified job (or more) day-after-day, year-in-year-out. This is the result of 30 years of constant research and development; the result of 10,000 separate installations of Marley mechanical draft cooling towers. Today Marley has positive performance data for every tower for any location and Marley backs its knowledge with an equally positive guarantee.

Test after test have proved the efficiency of Marley rating methods. These tests have been conducted according to procedure specified by all accepted test codes. The Marley tower you purchase is subject to the same complete test after installation.

"Calculating Cooling Tower Performance from Test Data," a new Marley brochure explaining a simplified method of analyzing the actual performance of any type mechanical draft cooling tower will be available soon. May we have your name for an advance copy?

The Marley Company

Kansas City, Missouri

MARLEY

Tool Repair Tag Does Double Duty

A TOOL repair tag is helping repairmen pin-point standard small tool malfunctions at Temco Aircraft Corporation, Dallas, Tex.

Names of parts in which air and electrical tool breakdowns most frequently occur are printed on one side of the 4½ x 5½ in. card. The operator merely checks the part he finds defective, and his tip is passed along—by means of the tag—to the repairman.

Repairmen, in turn, go directly to the cause of the trouble instead of first having to find it. This has meant a vast savings in maintenance time spent on the 150-odd types of small tools used at Temco.

The back side of the tool repair tag provides a replacement parts ledger form on which the Tool Crib clerk can post a running inventory of parts used and the balance remaining in stock.

This feature has cleaned the Main Tool Crib shelves of bulky files formerly used for tool and parts records. It has shortened records posting time by about two or three hours a day.

Tools destined for repairmen formerly were merely marked with the operator's name to insure that the repaired item would be properly returned. Sometimes a balky tool, on arriving at the repair shop, operated satisfactorily; whereupon it was cleaned and oiled and returned to the shop user without proper repair.

Repairmen usually located a faulty part only after they had trial-and-error tested other parts. With an average of 100 hand tools needing repair or cleaning every day, it was difficult to trace, as well as fix, trouble spots.

R. S. Morris, employee in Temco's Main Tool Crib, submitted the basic idea for the new tag. Foreman Olin Harris then helped develop the tag into an all-purpose reference card.

How Tag Works

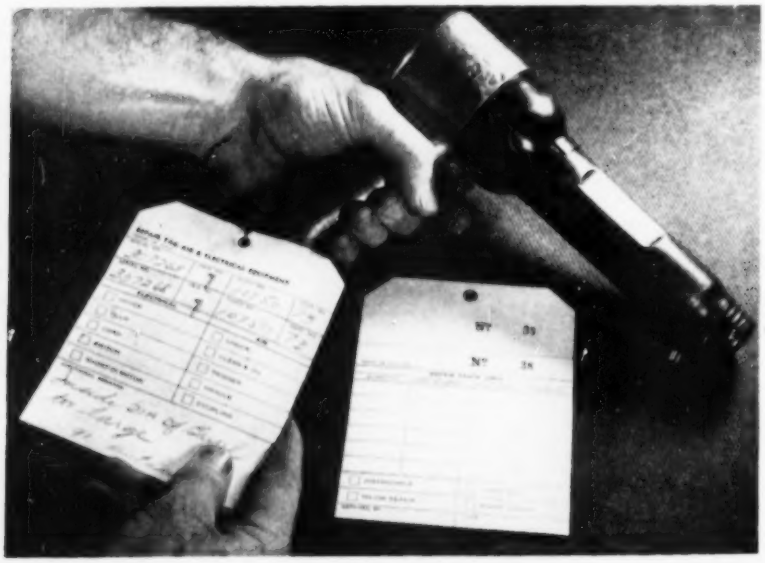
The operator writes his identification and his diagnosis of the trouble on the tag when he submits his power tool for repair at one of Temco's nine tool cribs. Tagged tools are routed to the Main Crib where repairmen are stationed.

They refer to one side of the card to make repairs, then reverse the card to log the name, stock number and quantity of parts they used in repair. Then they detach the main part of the card, leaving only the user's identification stub attached to the tool. This stub steers the tool back to its original owner.

The detached ticket, meantime, goes to the Parts Crib for a double-check on the accuracy of parts numbers, then to the Main Crib file clerk for posting. Referring to the tickets, she deletes from her master parts book stock list the parts that were used in repair. Finally, she files the tickets in manila folders.

There is a folder for each serial-numbered small tool in the plant. Tickets inside each folder give a complete case history on that particular tool.

It is a simple matter to check the incidence of repair, not only for a family of tools, but also for an individual tool. This feature has helped Tool Crib employees determine when an aged tool is due for salvage rather than further repair.



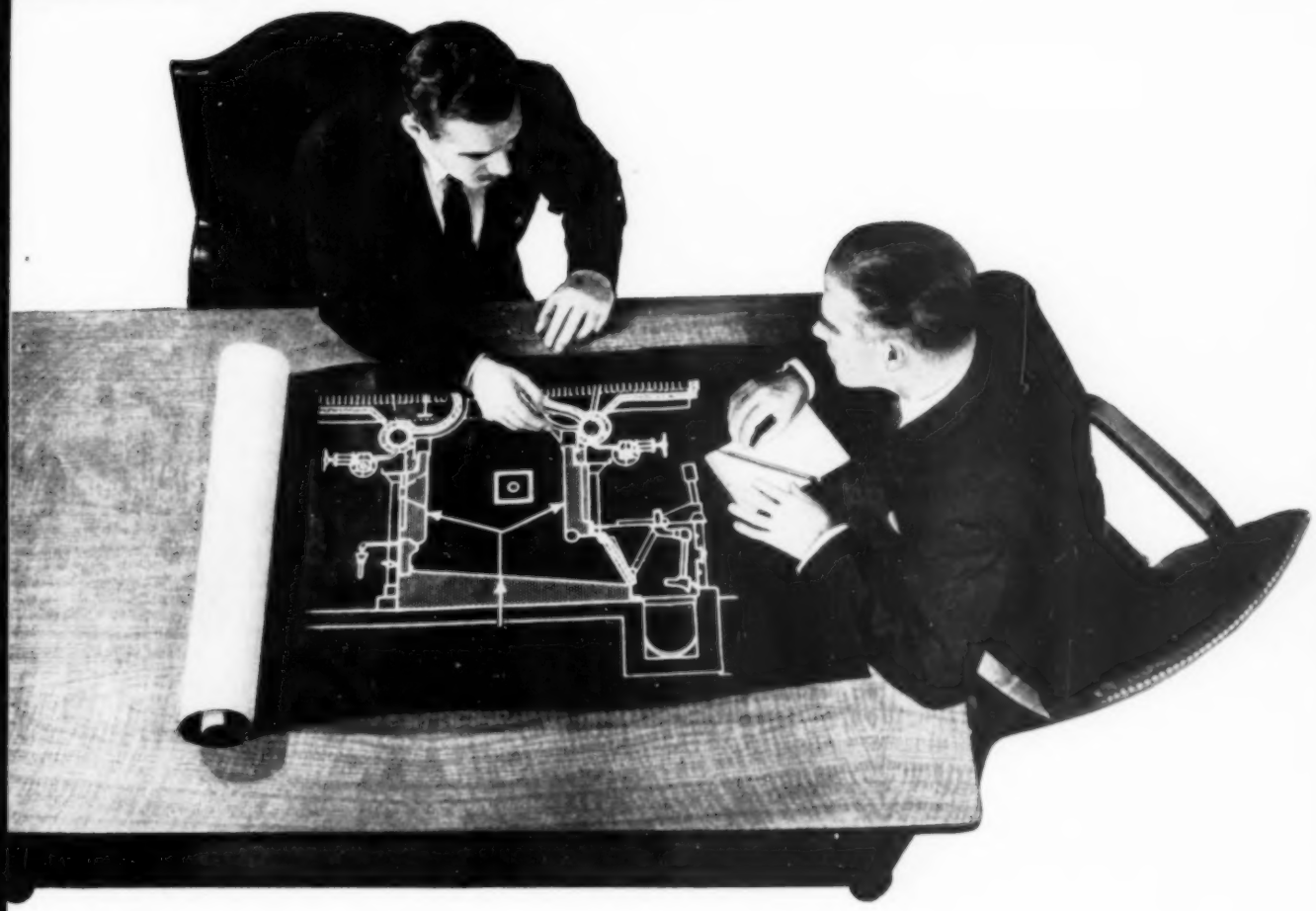
NEW TOOL REPAIR TAG is designed to assist both in tool repair and in the inventory of parts used in repair. One side of the card lists services needed most frequently for small electric and air tools. The operator checks the applicable block, or makes his request under "Additional Remarks," as the operator of this rivet gun has done. The card's opposite side, as the blank tag above indicates, has columns in which parts used in repair are logged. The card—except for a detachable stub—is filed as a permanent tool repair record.

$$$ For Your Ideas

Send your ideas, methods and short-cuts to Southern Power & Industry. Payment is made for suitable material—a photo or rough sketch will make your idea more valuable.

Articles from maintenance and production men in Southern and Southwestern plants are preferred. Material must not have appeared elsewhere nor been sent to another publication.

Southern Power & Industry
806 Peachtree St., N.E.
Atlanta 5, Georgia



PROMINENT PUBLIC UTILITY

Cuts ashpit maintenance with B&W Refractory Concretes

A trial installation of B&W Refractory Castable "A", a 2600 degree refractory concrete, was made in one boiler ashpit. To date this castable has given 25 months more maintenance-free service than the refractories previously used.

Results of this first trial were so encouraging that another ashpit, shown in the drawing above, was lined with B&W Refractory Castable "A". In this installation the two opposing high velocity water sprays cut refractories life two ways. First, water splattered on the hot walls (about 1800F) caused spalling. Second, the high velocity water jets had an abrasive effect on the floor refractories.

Here's the report: "After 20½ months service, B&W's Castable "A" lining was still in excellent condition—far superior to the refractories used before."

On the basis of these trials three other boiler ashpits have been lined with this 2600 degree castable.

In addition to ashpit linings, B&W Refractory Castable "A" is widely used in boilers for baffles, hearths, door linings, special shapes, repairing eroded brickwork and forming pier walls in stoker-fired boilers.

B&W Castable "A" is only one of a line of B&W Refractory Concretes which cost-conscious boiler operators are putting to increasing use in many different applications. These B&W Concretes may help you cut installation costs and lengthen furnace life. Consult your B&W Field Engineer.

BABCOCK & WILCOX

THE BABCOCK & WILCOX CO.
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R470A

Ideas . . Methods . . Gadgets (Continued)

Chute Protection

Rubber Faced Plate vs Baffles

THE METHOD for increasing the life of sand chutes at the Anderson Concrete Company in Anderson, South Carolina, was described in one of your recent issues (SP&I for June, Page 113).

On one of the company's chutes, 3/16" steel wore out in from three to four months. They used rubber faced steel plate (abrasion resistant rubber vulcanized permanently to sheet steel) which lasted sixteen months, over four times as long.

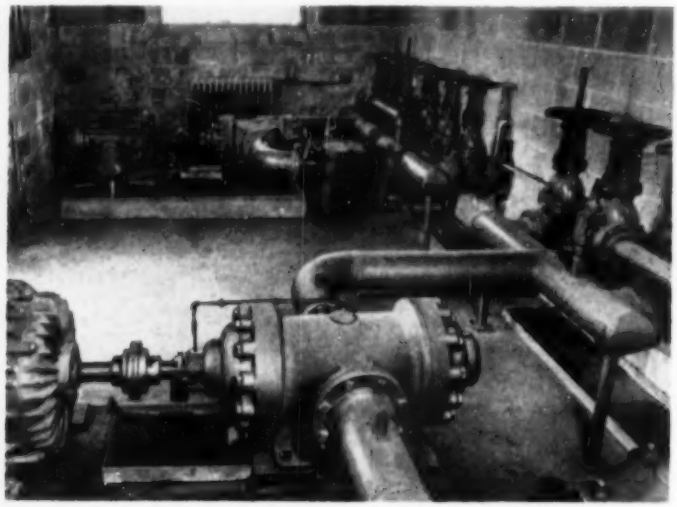
I have encountered many similar conditions. We tried the rubber cure repeatedly; found it good, but still lacking.

In our non-ferrous castings foundry we found that such a rubber lining produced fairly good results. But we needed something even better. The method that I will describe was first tried out on a hopper bottom sheet that wore through every three weeks. When the quarter-inch steel would wear through we would simply weld another sheet over it. Sometimes we had as high as four sheets tacked onto the bottom of that chute waiting for a shutdown to prepare the job in a proper manner.

One of our plant engineers finally solved the problem. After noting the horizontal angle of the chute bottom, he prepared a bottom sheet with baffles tack welded on the side that was to be exposed to the stream of sand. These were made of quarter-inch by two-inch steel strips set on edge on the sheet's surface, crosswise of the sand flow. They were set close enough so that the sand they would catch and hold would cover and protect the sheet that would ordinarily have been subject to the abrasive action of the sand stream. The result was that the sheet stood up for fourteen months of severe service.

The impact spot of a sand stream on a vertical steel sheet would probably offer a more difficult problem. However, such a location is simply a little harder challenge to the skill and patience of the plant engineer. If he designs and places the baffles correctly, so as to really hold the inert sand where it is wanted, his wearout problems of that spot are over.

By Nelson Roeller, Maryland



Rotary Pumps Reduce Fuel Unloading Time

VISIONS of fuel oil delivery trucks bogged down by inclement weather or other disturbances no longer haunt the Colorado Fuel & Iron Corp. steel mill in Claymont, Delaware. A million-gallon reserve tank, recently installed, now provides a comfortable cushion against the shock of a snapped link in the chain of fuel supply.

But a reserve tank was only half the answer. With a daily consumption of approximately 60,000 gal., fuel had to be kept on the move at a rapid rate if ample reserves were to be maintained.

Gravity unloading of the oil tank trucks, at the rate of 4000 gal. per ¾ to 1 hour, was too slow for the need. The solution turned out to be two high capacity rotary pumps that reduced unloading time from a would be 'round-the-clock marathon to a little under six hours. Used interchangeably, with one on standby call, the pumps unload the fuel oil from tank trucks into the reserve tank and transfer the oil to the burners' service tank as needed.

The pumps are of the De Laval-Imo line of pumps manufactured by the De Laval Steam Turbine Co. and supplied to the user through Dravo Corp. The pumps are rated at 18,000 gph of Bunker C fuel oil at 75 psig discharge pressure at a speed of 870 rpm for a viscosity range of 200-2000 SSU. With an input of 23 bhp, for a viscosity of 2000 SSU, the pumps have a maximum suction lift of 20 ft.

Make Bolts Right Length

ONE often finds a spot where overlong bolts are put in — perhaps a concrete man, setting foundation bolts has no knowledge of what is to be bolted down, and so sets them way too high. When the job is done the excess length should have been hacksawed off, but almost always this job is left for someone else to do.

When the nuts are to be taken off later, it usually pays off well to saw them off at the start of the dismantling job. This will be found to be quicker and easier.

Backing off a nut over a long and rusted thread is no cinch, especially if the location is unhandy. The hacksaw works much faster, if well handled. But many a thoughtless mechanic will stick to the wrench instead of the saw in such a case, to the detriment of both his muscles and the job. Cut off overlong bolts rather than force tight nuts off over all that excess thread. It pays off.

H. McBernard, W. Va.

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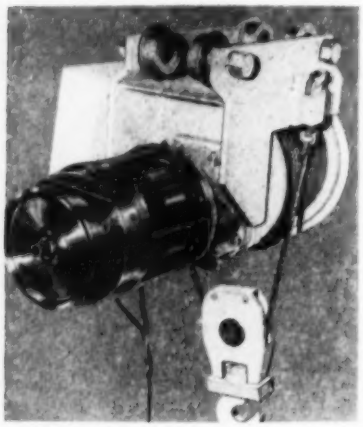
Equipment . . Supplies . . Methods

FOR FREE INFORMATION — Circle code number on pages 16 & 17

Heavy Duty Electric Hoist

H-1 R. G. LeTOURNEAU, INC., Longview, Texas, heavy equipment manufacturing company, announces a new line of electric hoists with capacities ranging upward from 4 tons, with special attention given to applications requiring lifts of over 15 tons.



Standard models of 4, 5 and 6 ton capacities have wire rope lift, with swivel hook suspended on a two-part line. Suspension is by lug, hook, plain or geared trolley.

Positive load control down to increments of a fraction of an inch is offered. The extra-sensitive load handling is made possible by the combination of instantly-applied maximum motor torque and a high-capacity, bi-metallic friction brake synchronized with the push-button hoist controls. Hoist brakes are made as an integral part of the motor. When the motor is started in either direction of rotation, the brake is automatically disengaged. Positive-action limit switches are available as optional equipment.

Motors operate from a power source of 220 or 440 volts, 3-phase, alternating current. These motors are single speed, reversible "squirrel cage" induction type with their rotor circuits completed outside the stator windings.

Other items in the new line of materials handling products are: the 360° Jib Cranes for factory use; the Floating Gantry Crane, incorporating a traveling electric hoist to handle cargo between ship and shore; the Jackknife Crane, a 20-ton-capacity mobile crane, mounted on electric wheels to lift, carry and spot cargo over rough terrain or unpaved storage yards; and the Revolving Crane, another electrically propelled and controlled mobile crane, featuring a boom with 360-degree rotation and 25-ton capacity.

Air Control Devices

H-2 PERFECTING SERVICE COMPANY, 332 Atando Ave., Charlotte 6, N. C., announces a new line of air control devices, consisting of regulators, filters, lubricators, automatic drain traps, quick coupling connectors, and Air Seals.

The PSC Regulator employs a balanced piston principle with automatic bleed off, making possible sensitive adjustments to ¼ pound. It automatically compensates for volume increase or decrease, permitting multiple applications without resetting. Large self-cleaning orifices reduce wear and maintenance.

The filter uses the cyclone principle to remove free water and oil from air lines. Uniform filtering through tight woven wool filter element, filters out particles as small as 30 microns in size. Plastic cylinder permits visual inspection.

The lubricator, having a venturi action, supplies atomized oil to pneumatic equipment. The amount of oil injected into the air stream is directly proportionate to the flow and volume of air consumed. Balanced pressure principle prevents flooding.

The line includes a unique combination of Air Regulator, Lubricator, and Filter in one compact assembly, simplifying installation and requiring only two connections.

Coal Tar Protective Coating in Tape Form

H-3 THE TAPECOAT COMPANY, 1521 Lyons St., Evanston, Ill., is offering "Tapecoat," a product made of close-woven fabric saturated in coal tar with an even thickness of coating on both sides of the tape, to give protection against corrosion on pipe and other surfaces.

Note how voids are filled and bridging eliminated by use of torch to keep Tapecoat soft and pliable to conform to surface contours.

The coal tar serves as both bond and protection. The tape is resistant to moisture, acids, alkalis, soil stress, electrolysis, chemical fumes, fly ash, and other severe conditions. It withstands hard usage and abrasive conditions.

Tapecoat comes in handy rolls, in widths of 2", 3", 4", 6", 18" and 24". It is easily applied to clean, dry surfaces with the use of a torch to bleed the coal tar coating for a perfect bond. Wrapping is done spirally on widths up to 6", overlapping slightly more than half the width of the tape. For widths of 18" or 24" Tapecoat "cigarette-wrapping" is recommended.

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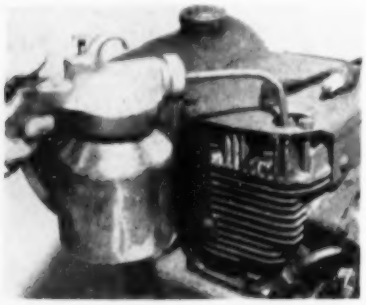
Equipment . . Supplies . . Methods (Continued)

Volatile Corrosion Inhibitor

H-4 SHELL OIL COMPANY, 50 West 50th St., New York 20, N. Y., has announced a new addition to its line of volatile corrosion inhibitors, VPI-250. Portions of this crystalline amine nitrate compound volatilize very rapidly and will prevent rust almost immediately. At the same time, some of its constituents evaporate more slowly, for longer-lasting protection.



Internal parts of engines, compressors, pumps, etc., are kept rust-free by injecting Shell Oil's VPI-250.

In addition to offering quicker yet longer rust prevention, the new material also flows more freely than any available heretofore. VPI-250, a white powder about as fine as talcum, will not clog a flocking gun, and can easily be applied with a squeeze bottle, a salt shaker, or any similar device. Where spraying or dusting is impractical, the powder may be dissolved in alcohol and applied in solution.

The material does not have to be applied directly to the surface it is to protect. If a quantity of the powder is simply dropped into an enclosed space, its vapors will penetrate even into hard-to-reach areas and condense on all surfaces. The minute crystalline film of VPI does not have to be removed from equipment before it is placed into operation, as would be the case with grease or petroleum. Only small quantities of the material are required for complete protection in shipment or storage, or between successive processing steps. Small items, such as tools, can be removed from a VPI protected atmosphere, used, and then replaced without the need for any additional rust-preventive measures.

Spraying VPI into tool-chest keeps rust off tools. Any ferrous or aluminum parts and equipment may be similarly protected against corrosion.

The product effective in preventing corrosion under high humidity in internal combustion engines, tools and dies, sand blasted parts, continuous strip steel, anti-friction bearings, stamping and forgings, sheet metal components and parts to be plated, machine tools and a wide variety of similar applications. It is also a rust inhibitor in hydraulic fluids and in water soluble paints for general-purpose industrial coatings.

Detecting & Locating Leaks in Pressure Piping Systems

H-5 UNIVERSAL CONTROLS CORPORATION, 731 W. Davis St., Dallas, Texas, has developed an instrument called the "Dragnet Leak Detector," for testing piping for gas, steam, water, oil, refrigerants, air and other pressure or vacuum systems.

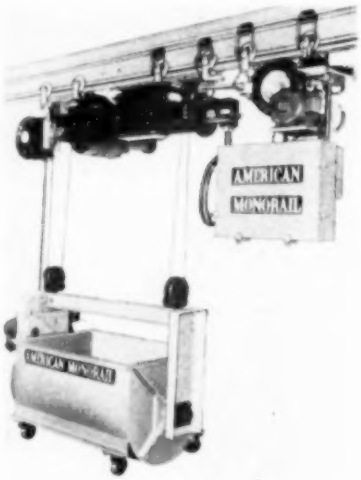
The unit is portable and consists of a test pump, air storage tank, pressure gauge, transparent bubble bowl with non-freezing fluid, and a flexible hose for connecting to piping under test.

After the piping system is pumped with air to the desired pressure, the by-pass valve is closed, requiring any air entering the pipe from the storage tank to flow through the bubble bowl. Any leak in the piping brings air from the storage tank through the dip tube in the bubble bowl, causing the liquid to bubble, thus indicating the leak. If no bubbles occur when the by-pass valve is closed, then there is no leak in the piping system.

A filler plug in the storage tank is provided for injecting leak-locating odorant or chemical. This mixes with air and is pumped out to the piping. A complete test can usually be completed within 10 to 15 minutes.

Automatic Carrier With Roll-Over Bucket

H-6 THE AMERICAN MONORAIL COMPANY, 13107 Athens Ave., Cleveland, Ohio, is offering a new automatic carrier with roll-over bucket for intermittent transfer of bulk materials between a single loading point and any number of discharge stations.



It consists of a standard twin-hook electric hoist for raising and lowering the special bucket equipped with casters for manual positioning on the floor. This bucket is mounted within a rigid frame with one end geared to an electric motor which turns the bucket one complete revolution at the discharge point.

Electric controls for automatic dispatch, station selection as well as manual operation are also carried on the unit.

Automatic carrier of this type has been built for small batch transfer of core sand, fertilizer and other bulk materials.

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Note the wide range of subject matter:

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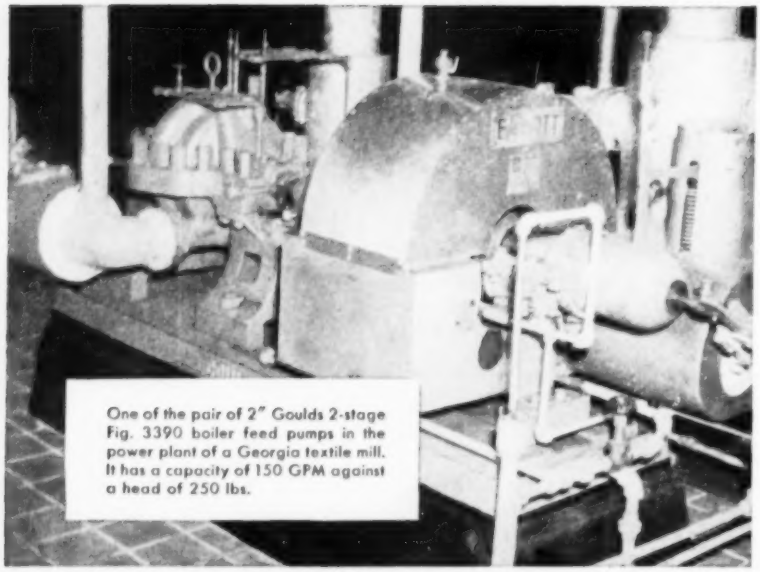

One of the pair of 2" Goulds 2-stage Fig. 3390 boiler feed pumps in the power plant of a Georgia textile mill. It has a capacity of 150 GPM against a head of 250 lbs.

Pair of boiler feed pumps going strong after seven years of round-the-clock service

When an important southern textile mill added a 100,000-lb. steam boiler to one of its power plants in 1947, it installed a pair of Goulds Fig. 3390 centrifugal pumps to feed it.

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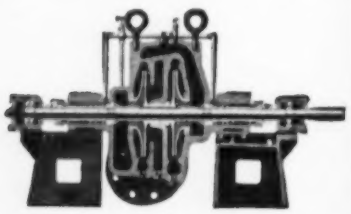
That's an example of the kind of performance you can expect from Goulds pumps in any kind of industrial application. Goulds engineers have a background of knowledge and experience gained through 106 years of pump manufacturing. They are ready to help you select the pump that meets your specific requirements, or to consult with you on any pumping problem. Your inquiry will be welcome.



Cross-section of Goulds 2-stage Fig. 3390 pump, showing impellers opposed for hydraulic balance, and other important features of construction. For additional information ask for Bulletin 722.3.

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new equipment (continued)

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Packaged Generator

H-7 YORK-SHIPLEY, INC., York, Pa., has developed the "Steam-Pakette" in sizes ranging from 15 to 30 hp for high-pressure (125 lb) steam application.

The unit can be used with light (No. 3) fuel oil, gas or combination firing of either oil or gas. The change-over from one fuel to the other on the combination firing models is accomplished by throwing a single switch.

The Steam-Pakette is small in physical size with an overall width of 40", height of 58⅝", and length of 85⅝". The units are delivered fully wired to the control panel, requiring only a minimum of on-the-job wiring.

Gun-Sprayed Fibre Insulation

H-8 COLUMBIA ACOUSTICS AND FIREPROOFING COMPANY, Stanhope, N. J., is manufacturing a special blend of mineral wool fibres which is easily applied to ceilings and walls by spray-gun method.

The new blend forms an attractive surface with high-insulating, fireproofing and sound-absorbing qualities. Its original color is white; however, it may be painted any desired color.

"Cafco Spray" applied to any clean rigid surface, such as metal, transite, plaster, wood, poured or slab concrete, gypsum or wire lathe, proves itself practical for thermal insulation, acoustical control and fireproofing.

As a fireproofing material, it is capable of a 4-hour fire rating, does not crack or deteriorate upon exposure to intense heat, and retains its flexibility.

D-C Rectifier Brake For A-C Cranes & Hoists

H-9 HARNISCHFEGER CORPORATION, Milwaukee, Wis., announces development of the "RCD" Brake, which marks the first time that d-c rectifier brakes have been available for a-c operated hoists and smaller capacity cranes.

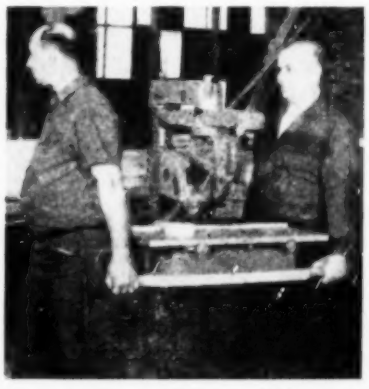
This new brake with its sturdy selenium rectifier which has no moving parts eliminates the drawbacks of a-c solenoids, most troublesome of which has been the erratic operation caused by loose laminations.

Offered now on the type R P&H Hevi-Lift Hoist and Trav-Lift Crane, this brake provides direct action with very short stroke. With low voltage (24 volts) operating coils having fewer turns, inductance is less and action is quicker. Both setting and releasing of the brake are extremely fast, providing exceptional control in all hoisting and lowering operations.

Portable 10" Radial Saw for Plant Maintenance

H-10 DELTA POWER TOOL DIVISION, ROCKWELL MFG. CO., 430 N. Lexington Ave., Pittsburgh 8, Pa., has introduced an entirely new portable 10 in. radial saw designed for easy movement from department to department to reduce plant maintenance problems.

Costing less than half as much as the larger radial saws, the new Delta 10 in. portable is reported to perform all basic cuts, with capacities previously considered possible only with 12 in. and 14 in. blades. The new tool will involve practically no maintenance and repair costs. Also it has the advantage of a heavy-duty, constant speed motor in place of a universal, high-speed type.



Delta portable radial saw weighing only 243 lb will cross-cut a full 16" in 1" stock and rip up to the center of a 48" panel.

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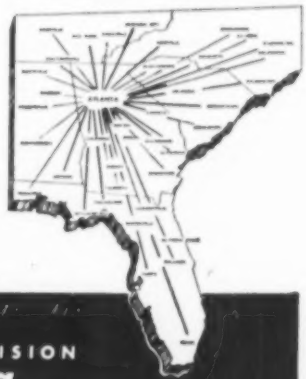

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Equipment . . Supplies . . Methods (Continued)

Snap-On Pipe Insulation

H-11 GUSTIN-BACON MANUFACTURING CO., 210 W. 10th St., Kansas City, Mo., announces that hot and cold piping from ¾" to 24" in diameter can now be covered quickly and economically with G-B "Snap-On" Pipe Insulation —one-piece molded pipe insulation of fine glass fibers.

The new product is available in three and six foot lengths, depending on pipe size. Small pipe sizes (diameter up to 2") will be in three-foot lengths. Wall thicknesses of ½", ¾", 1", and 1½" are available in sizes to 12" pipe size; and 1", 1½", and 3" wall thickness for piping above 12" diameter.

It will not break in shipment or on the job, and is virtually immune to damage from wetting or bumping. It is feather light and literally a one-man application. Highlight feature is its outstanding thermal efficiency.

For any given insulating job, G-B Snap-On costs no more than other pipe insulating materials—and saves substantially in application costs. The user simply spreads it open at the single seam and snaps it over the pipe. The seam is joined tightly with staples or other conventional means. The material can be painted, left "as is" in concealed spaces, or finished as desired. It is also available with factory-applied vapor barrier for cold piping and with a weatherproof roofing paper for outside lines. There is virtually no clean-up time required because the product will not flake or crumble when dry, won't get muddy or messy when wet.

This insulation has all the desirable characteristics of other G-B glass fiber products. It can be cut with a knife. It is extremely light in weight (3' section, ¾" size, ½" wall thickness weighs only 8 oz). It is dust-free—contains no coarse irritating fibers and will not shrink on the pipe.

. . now available for hot and cold piping from ¾" to 24" in diameter

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Galvanized Surface Paint

H-12 TROPICAL PAINT & OIL COMPANY, 1125 West 70th St., Cleveland 2, Ohio, is offering "Zincoater" as a solution to the problem of finding a paint that will adhere to a galvanized iron surface.

Due to a chemical reaction between the paint and the galvanized surface, water-soluble zinc salts are formed, causing the paint to loosen and peel. However, the new product adheres firmly to any galvanized iron or zinc surface. Formulated on the fact that zinc adheres to zinc, Zincoater combines metallic zinc dust with a phenolic resin vehicle and tung oil.

The result is a durable gray finish that can be covered with enamels or other paints. There is no harmful chemical reaction between Zincoater and either the galvanized surface or the finish coat. It is easily applied by brush, roller or spray, and dries to the touch in two hours.

Gasoline Power Saw

H-13 WRIGHT POWER SAW AND TOOL CORPORATION, 292 Longbrook Ave., Stratford, Conn., has developed the new Gasoline Wright Saw, which is said to combine the versatility, simplicity, and efficiency of the well-known hand saw with high-speed power.

weighs less than 25 lb

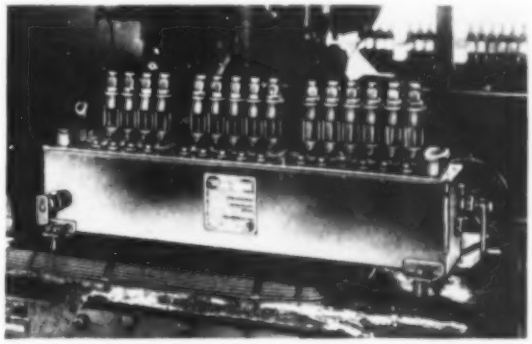
This saw consists of a reciprocating blade directly connected to a gasoline engine to form a dynamically balanced universal wood-cutting tool. It can fell, limb, and buck trees and can be used like a powered hand saw to trim, notch, and rip lumber. The saw will also follow a chalk line, cuts a kerf of only 3/16 in., and leaves a mill surface on the wood.

To reduce operator fatigue, use is made of lightweight high-strength alloys with the result that the machine weighs less than 25 lb. The 18-in. reciprocating blade eliminates kicking or grabbing. A special float-type carburetor with an exclusive wick feed allows operation of the saw in all attitudes, including upside down. No swivels or special adjustments are required.

IS DOWNTIME UPPING YOUR COSTS?

CUT IT WITH MANZEL FORCE FEED LUBRICATION

Pressure Application—Exact Amounts—Accurately Timed



Because they operate automatically—dependably lubricating vital parts without thought or attention whenever machinery is running—Manzel Force Feed Lubricators eliminate costly shut downs for hand oiling and for repairs necessitated by faulty or neglected lubrication. They save labor and lubricants, too.

To keep costs down and production up, keep machines running with Manzel Force Feed Lubricators. They can be installed on machinery you are now using or incorporated into new equipment. For information write:

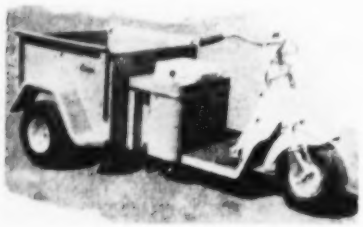
Manzel

DIVISION OF FRONTIER INDUSTRIES, Inc.
318 BABCOCK STREET, BUFFALO 10, NEW YORK

Equipment . . Supplies . . Methods (Continued)

Light Hauling Vehicle

H-14 CUSHMAN MOTOR WORKS, INC., Lincoln, Nebraska, manufacturer of motor scooters and light hauling vehicles, announces that it has gone into full scale production of an entirely new 1954 model pickup Truckster.



The new light three-wheel vehicle uses a shaft drive, automotive type differential, a transmission with three speeds forward and one reverse, plus a rear-mounted pick-up style body.

The rear-mounted steel box has nearly 10 cu ft capacity and will handle payloads of up to 500 lb. It comes complete with tailgate and stake holes for mounting sideboards.

The 780 Truckster is powered by a four-cycle, five horsepower engine. It will operate at speeds up to 35 miles per hour, and deliver up to 50 miles per gallon of gas.

Concrete Floor Repairs

H-15 A. C. HORN DIVISION OF SUN CHEMICAL CORP., Long Island City, N. Y., announces a new repair and patching compound that makes it possible to repair cracks and holes in interior concrete floors quickly and permanently, with practically no interruption of plant production or materials handling.

Called "Kwik-Roc," and supplied in powder form, the new material is simply mixed with water, poured into the cleaned out hole or crack, and leveled with the surrounding floor. Normal traffic may be resumed over the repaired area within 45 minutes after pouring.

According to the manufacturer, it has more than twice the compressive strength of average concrete used in floor construction. However, this product is not recommended for use on exterior surfaces; on interior floors that are constantly wet or subject to spillage of water or acids; or for resurfacing entire floor areas.

Carbon Removing Solution

H-16 LESTER LABORATORIES, LTD., P. O. Box 4897, Atlanta, Ga., have developed a new cold-dip, non-corrosive, carbon removing solution for use during overhaul of gasoline and diesel engines.

The new product, known as "Karbon King," is based on a chemical principle which is said to be an improvement over previous carbon removing compounds that were based on cresylic acids, a chemical with objectionably strong phenolic odor. "Karbon King" is claimed to reduce substantially the amount of labor previously required, and at the same time it eliminates the toxicity hazard of carbon removing. It is non-corrosive on all commonly used metals such as aluminum, magnesium, copper, and steel.

Concise Bulletins and Data Sheets on refractory applications should be in your files. Write now for your set.

Old boilers, new boilers, and any size they come...

When you line the fire box with an IRONTON refractory, it will be a long, long time before you give it another thought. Whether the job is done with fire clay brick, monolithic plastic refractory, or newly perfected castables . . . your best bet is an IRONTON product made from Kentucky flint and semi-flint clays. Get the facts today.

Make a "PATCH TEST"

Before you go into any boiler reconditioning job, tell IRONTON what you're up against. We'll send samples of materials for you to test under conditions in your own boiler setting.

Representatives in the South:

RELIABLE REFRACTORIES — THE IRONTON FIRE BRICK COMPANY, IRONTON, OHIO

Baltimore, Md. - MUlberry 7184
Birmingham, Ala. - Phone 4-4754
Chattanooga, Tenn. - Phone 7-6697
Jacksonville, Florida - Phone 3-5586
Miami, Florida - Phone 82-5782
Silver Spring, Md. - JUniper 7-5468
Kentwood, La. - - Phone 2191

Packaged Chemical Feeder

H-17 THE HILLS MCCANNA COMPANY, 3025 North Western Ave., Chicago 18, Ill., has designed a packaged tank and pump unit for boiler rooms with limited space.

The pump is mounted on the structural supports directly below the chemical tank. The unit comes with dissolving basket, tank gauge glass, suction piping, shut-off valve, and suction line strainer completely assembled. The pump is the standard adjustable stroke length "U" pump well known in power plants for the addition of all water treating chemicals. The tank can be of either the 50 or 100 gallon size and comes with a mount for a mixer, which is optional. The pump has capacities up to 24 gph per feed to inject chemicals at two locations, or the tank may be baffled to contain different chemicals. This design eliminates the need for a separate pump foundation in addition to the smaller space requirement.

Recording Controller

H-18 GENERAL ELECTRIC COMPANY, Meter and Instrument Department, Schenectady 5, N. Y., has announced a new line of process instruments including potentiometric and a-c bridge recorders and recording controllers.

The instruments, designed for continuous measurement and control uninterrupted by periodic standardization, incorporate new measurement circuitry and components. Foremost among the new features are a magnetic standard in the potentiometric system and a bridge-balancing unit in the a-c bridge system.

Both models are available with either electric or pneumatic control, and are equipped with a unique centerless pointer that simplifies chart changing and leaves practically all of the chart exposed to view for easy reading.

The new magnetic standard eliminates dry cells, slidewires, and many moving parts found in conventional potentiometric instruments.

Heart of the a-c bridge system, the new bridge-balancing unit supplies power to the bridge and provides a means for rebalancing it. In cases where the variable under measurement is temperature, the circuit is unbalanced by changes in the resistance bulb. Balancing is achieved by a servo motor which repositions the balancing unit's rotor.

Additional information is available in G.E.'s bulletin GED-2100.

A NEW more reliable air conditioning method

with exact moisture control

FOR YOUR PROCESS OR PROTECTION

FOR TESTING PRODUCTS OR MATERIALS AT ANY TIME OF THE YEAR

ASSEMBLING ELECTRONIC PARTS

PACKAGING FOOD PRODUCTS

● This Niagara "Controlled Humidity" method gives you the **MOST EFFECTIVE** Air Conditioning because its cooling and heating functions are made completely separate from adding or taking away moisture. This assures you always a precise result. No moisture sensitive instruments are needed.

MOST FLEXIBLE. You can reach and hold any condition in response to instrument settings, or vary it as you wish.

EASIEST TO TAKE CARE OF. The machine is accessible, the control circuits are simple and easy to operate, and there are no solids, salts or solutions to be handled.

MOST COMPACT. It does a very large amount of work in a small space.

INEXPENSIVE TO OPERATE. At normal atmospheric temperatures (unlike systems that use refrigeration to dehumidify) it needs no summer re-heat.

DRYING INDUSTRIAL MATERIAL

Write for Bulletins 112 and 122

NIAGARA BLOWER COMPANY

DEPT. SP, 405 LEXINGTON AVE. NEW YORK 17, N. Y.

Niagara District Engineers in Principal Cities of U. S. and Canada

News for the South and Southwest (continued)

(Starts page 8)

Harry P. Leu, Inc.—Orlando

Top level organization changes have been announced by HARRY P. LEU, INC., veteran distributors of machinery and industrial supplies, with headquarters at ORLANDO and a branch at MIAMI, FLORIDA.

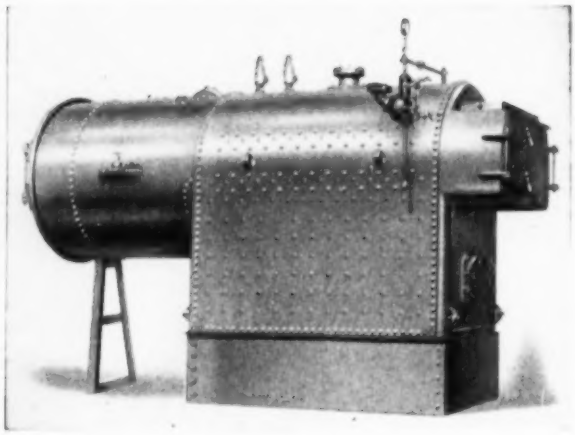
Harry P. Leu has retired as president, to become chairman of the board, and Paul J. Stine is advanced from general manager to president. Mr Leu joined the forces of Cain and O'Berry in 1904 as sales engineer and trouble shooter, and rose in the ranks in the ensuing years until he became president and owner of the institution which now bears his name.

Mr. Stine started with the Leu organization in 1934 as a salesman, and became general manager in 1940.

Harry P. Leu, Inc., occupying buildings in the heart of Orlando, with practically 4 acres of floor space, carries more than 30,000 types of items in stock from a small tack to a steam boiler. The company handles the products of more than 600 nationally known manufacturers.

Mr. Leu and Mr. Stine have announced that there will be no change in the company policies because of the changes in management.

POWER
with POWER *to spare*



A NEW DOUBLE PASS ALL-PURPOSE INDUSTRIAL AND HEATING BOILER

SOUTHERN MADE FOR SOUTHERN TRADE

Made in sizes from 44 H.P. to 153 H.P. S.B.I. rating with pressure to 150 lbs. Designed for coal, gas or oil firing, the New Lucey Double Pass Boiler can be furnished complete as a package unit.

This boiler is in addition to our regular line of single pass fire box boilers which we have been making since 1918.

WRITE FOR BULLETIN NO. 153 FOR COMPLETE SPECIFICATIONS

LUCEY BOILER
AND MANUFACTURING CORPORATION

CHATTANOOGA, TENNESSEE
1614 CHESTNUT ST. CHATTANOOGA
1312 STERLING BLDG. HOUSTON, TEXAS

Ladish Acquires Tri-Clover

LADISH CO., Cudahy, Wisconsin, manufacturer of seamless welding pipe fittings, forged steel fittings, flanges and a complete range of drop forgings, has announced the acquisition of the assets of the TRI-CLOVER MACHINE CO., Kenosha, Wisconsin, which will operate as a division of the Ladish Co. No change in personnel is planned. Tri-Clover president, Ferdinand Hinrichs, has been appointed a vice president of the Ladish Co. in charge of the new division.

ALCOA Transfers: Ala., Ark.

ALUMINUM COMPANY OF AMERICA has announced the transfer of two Refining Division men.

DEWEY E. SIBBLES, office manager of the BAUXITE (ARK.) ALUMINA WORKS, has been named to a similar post at the greatly expanded Mobile Works in ALABAMA.

WILLIAM C. JOHNSTON, senior accountant for Alcoa in Pittsburgh, has been named office manager of the Bauxite Works.

Mr. Sibbles joined Alcoa in 1922 at the East St. Louis (Ill.) Works as a cost clerk, and held position of chief clerk at other Alcoa plants including Mobile (Ala.) Works, Baton Rouge (La.) Works, Hurricane Creek (Bauxite, Ark.) Works, and Bauxite Alumina Works.

Cooper Alloy—Southeast

The appointment of JAMES WALLACE JONES of MONTEZUMA, GEORGIA, as District Representative for THE COOPER ALLOY FOUNDRY CO., Hillside, N. J., has been announced. His territory will include the states of TENNESSEE, ALABAMA, GEORGIA, MISSISSIPPI and FLORIDA.

A graduate of the University of Kentucky, Mr. Jones has been representing manufacturers in the Southeast for the past twenty-five years.

J. J. Finnigan Co. Opens Dallas & Houston Offices

WILLIAM J. MCALPIN, president of the J. J. FINNIGAN COMPANY of Atlanta, Georgia, has announced the establishment of new sales offices in DALLAS and HOUSTON, TEXAS.

I. P. Newby of Dallas

I. P. "IKE" NEWBY is exclusive representative in charge of the DALLAS, TEXAS, office. He is a graduate of the University of Michigan and was formerly Southwestern representative of the Rheem Manufacturing Company. He is a member of the A.S.H.V.E.

Manager of the HOUSTON, TEXAS, office is ALBERT A. STERLING, JR., with EDWARD K. STEPHENS as assistant. Mr. Sterling, a graduate of Rice Institute, comes to the Finnigan Company from Ingersoll-Rand where he served as sales engineer. Mr. Stephens is a graduate of the University of Houston where he majored in engineering.

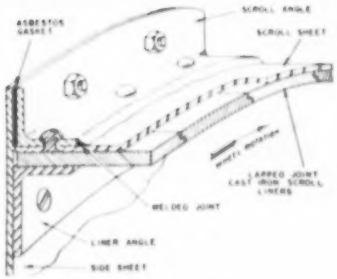
The J. J. Finnigan Company, one of the South's oldest fabricators of boiler plate, has been manufacturing boilers, tanks, and pressure vessels at their Atlanta plant since 1888. The current expansion program started two years ago with the opening of branch offices in JACKSONVILLE and MIAMI, FLORIDA, NEW YORK CITY, and LITTLE ROCK, ARKANSAS. Company has also built new and modern offices at 722 Marietta St., N.W. in ATLANTA, GEORGIA.

Albert A. Sterling, Jr., and Edward K. Stephens head up Houston office.

How a FAN HOUSING Helps Produce CHEAPER POWER

Here's a part of your power-producing equipment to watch, because it has so much to do with keeping your maintenance costs down and cutting draft timeouts to a minimum.

When you specify a "Buffalo" Induced Draft Fan, you get as rigid and heavy a housing as modern engineering can produce and still give you a highly efficient fan. You get a scroll shape that minimizes the powerful erosive action of hot fly-ash — with steel scroll liners to further delay erosion. These are easily replaced from inside or outside. All these "Buffalo" features combine to give these fans an extra margin of long life — in a "hot spot" where long fan life means big savings. And — many years later — when erosion finally necessitates repairs — "Buffalo" bolted sectional housing construction provides accessibility that shortens and simplifies the work.



Showing detail of "Buffalo" Removable Scroll Liner.

Naturally, all other parts of "Buffalo" Draft Fans are built of equally durable construction — rotors, shafts, bearings and inlet boxes. And the number of "Buffalo" Fans still carrying on after more than a quarter of a century, is proof of this endurance which means economy. Why not check "Buffalo" engineering by writing today for Bulletin 375O?

BUFFALO FORGE COMPANY
540 BROADWAY BUFFALO 4, NEW YORK

Publishers of "Fan Engineering" Handbook

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.
Sales Representatives in all Principal Cities

"Buffalo"

PRESSURE BLOWING COOLING HEATING FORCED DRAFT
VENTILATING AIR CLEANING AIR TEMPERING INDUCED DRAFT EXHAUSTING

News of Manufacturers

RILEY STOKER CORPORATION has announced the appointment of ROBERT J. KRIEGER as vice president-sales. Mr. Krieger, a native of Louisville, Kentucky, has been with the company since 1922.

VAPOR HEATING CORPORATION, manufacturer of train heating systems, steam generators, mercury thermostats and electronic controls, has recently moved manufacturing operations and general offices into its two million dollar plant in Niles, 15 miles from the old plant in Chicago.

FRANK L. LAQUE has been elected vice president of THE INTERNATIONAL NICKEL COMPANY, INC., and manager of its Development and Research Division. O. B. J. FRASER and DONALD J. REESE are assistant managers of the division.

BULLDOG ELECTRIC PRODUCTS COMPANY of Detroit has recently become a subsidiary of I-T-E CIRCUIT BREAKER COMPANY of Philadelphia. BullDog will continue to operate under its own corporate name, with WILLIAM H. FRANK remaining as president.

AMERICAN LOCOMOTIVE COMPANY has established a new atomic energy projects department to be supervised by KENNETH KASSCHAU as manager of engineering.

FENMORE E. DUNN has been chosen as general manager of WORTHINGTON CORPORATION'S reorganized Vertical Turbine Pump Division. His responsibilities include product and application engineering, as well as manufacture and sale of vertical pumps produced at Succasunna and Denver.

Southern Representative: JOHN D. HOMAN, 14 So. Orleans Ave., Tampa, Florida

Collier Joins Warren's Richmond, Va., Staff

I. RUSSELL BERKNESS CO., 615 E Franklin St., RICHMOND, VA., who represent WARREN and WARREN-QUIMBY PUMPS in Virginia, announce the addition of ROBERT Q. COLLIER to their engineering staff.

Mr. Collier is a graduate of Virginia Polytechnic Institute in Mechanical Engineering and is a registered professional engineer in the State of Virginia. He has had well-rounded experience in the application and sale of industrial equipment.

Orr & Sembower—Kentucky

ORR & SEMBOWER, INC., Reading, Pa., has announced the appointment of OGLE ENGINEERING SALES, 3207 Preston Highway, LOUISVILLE, KENTUCKY, as sales and service representative handling Powermaster packaged automatic boilers in central and western Kentucky.

FRANK J. OGLE, JR., is in charge of activities.

Powermaster packaged automatic boilers for steam and hot water service are manufactured in two lines in sizes from 15 hp to 500 hp and for pressures to 250 psi using oil or gas fuels.

Philips Opens Houston Industrial X-Ray Office

The Research & Control Instruments Division, NORTH AMERICAN PHILIPS COMPANY, INC., 750 South Fulton Avenue, Mount Vernon, N. Y. has announced the opening of a new regional office at 4517 Fannin Street, HOUSTON, TEXAS.

ROBERT SEIBERT is manager of the new headquarters which serves an area that includes TEXAS, LOUISIANA, MISSISSIPPI and FLORIDA.

Equipment displayed and demonstrated in the Houston office includes the complete line of Norelco X-ray Diffraction and Spectrographic Instruments and Accessories; also Industrial Radiographic Units. Spare parts and service are also available.

Rockwell Promotes Johnson

ROBERT A. JOHNSON, ATLANTA district sales manager of the ROCKWELL MANUFACTURING COMPANY'S Meter and Valve Division, has been named New York district sales manager.

Mr. Johnson joined Rockwell in 1939 and was a sales engineer and assistant sales manager of liquefied petroleum gas products before moving to Atlanta.

Linbar Names Maddox

H. W. LINDERMAN, president of LINBAR, INC., 6710 Eureka Street, HOUSTON, TEXAS, has announced the appointment of J. PAUL MADDOX as vice-president and Director of Sales.

Mr. Maddox came to Linbar from Laclede-Christy following 22 years' experience with that company in various sales capacities. He has headed their Specialties Division, Distributor Division, Arch Division and was General Sales Manager of their General Refractories Division in 1947.

Linbar, Inc. represents Laclede-Christy Combustion Equipment Company, Furnace Engineers, Inc., Hapman-Dutton Company, Brule Incinerator Co. and Cro-Plate Co.

J. F. Pritchard—Kansas City

CHESTER F. SHORTAL has been named Manager of the newly-opened KANSAS CITY District Sales Office of J. F. PRITCHARD & COMPANY of California, serving Western Missouri and the State of Kansas. Mr. Shortal has been with Pritchard since 1951.

W. R. ROEYER has joined the company as Manager of Cooling Tower and Heat Exchanger Sales.

The company, a subsidiary of J. F. Pritchard & Company, is engaged in the manufacture of cooling towers, air-cooled heat exchangers, and gas drying and treating equipment for the oil, gas, chemical, power and general industries.

Ebasco Opens Dallas Office

EBASCO SERVICES INCORPORATED has opened a new office in the Southland Life Building, DALLAS, TEXAS, managed by W. A. BUCHANAN.

A graduate of Virginia Polytechnic Institute, Mr. Buchanan has had broad experience in engineering, construction, and general business consulting activities. He began his career in 1920 with Kentucky and West Virginia Power Company; later transferring to the Appalachian Electric Power Company as general superintendent, becoming district manager in 1929. In 1943, he was appointed general manager of Island Creek Fuel and Transportation Company and since 1947 has been associated with consulting engineering firms.

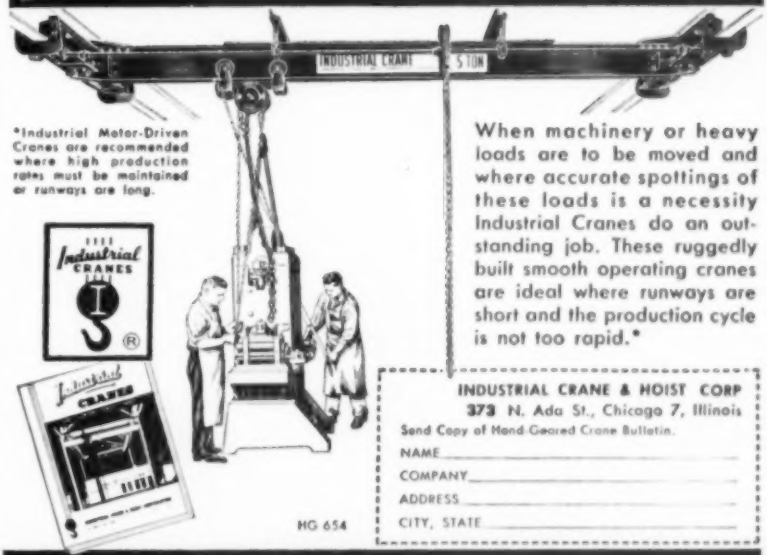
Worthington Acquires Mullenbach Plant

The Mullenbach Electrical Manufacturing Company of Los Angeles, manufacturers of a control device known as "Capaswitch," has been acquired by WORTHINGTON CORPORATION through its wholly owned subsidiary, the Electric Machinery Mfg. Company of Minneapolis.

Hobart C. Ramsey, president of Worthington, described the Capaswitch as an electric relay based on an entirely new principle. It is the first relay to employ electrostriction as an operating mechanism. In place of the conventional electromagnetic system the relay is actuated by a ceramic element which contracts upon being electrically charged and expands upon being discharged. This ceramic also has the characteristics of a capacitor since it will hold an electric charge.

Mr. Ramsey stated that the Mullenbach plant in Los Angeles will continue to be used as a pilot plant for the manufacture of the Capaswitch while larger facilities are being prepared for increased production. Operations will continue under the present management. The newly acquired company will be operated as the Mullenbach Division of the Electric Machinery Mfg. Company.

USE *Industrial* FOR HAND GEARED CRANES GREATER ECONOMY



*Industrial Motor-Driven Cranes are recommended where high production rates must be maintained or runways are long.

When machinery or heavy loads are to be moved and where accurate spottings of these loads is a necessity Industrial Cranes do an outstanding job. These ruggedly built smooth operating cranes are ideal where runways are short and the production cycle is not too rapid.*

HG 654

INDUSTRIAL CRANE & HOIST CORP
373 N. Ada St., Chicago 7, Illinois
Send Copy of Hand Geared Crane Bulletin.
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ADDRESS
CITY, STATE

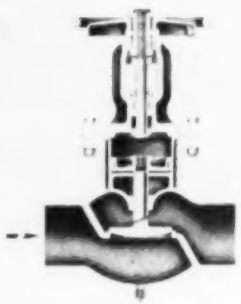
INDUSTRIAL CRANE & HOIST CORPORATION
(formerly Industrial Equipment Co.)
373 NORTH ADA STREET CHICAGO 7, ILLINOIS
Overhead Cranes · Jib Cranes · Monorail Systems · Crane Runways
Representatives in Principal Cities

Southern Representatives are Located in

Atlanta	Mobile	Dallas
Jacksonville	Nashville	San Antonio
Houston	Knoxville	Tulsa
Chattanooga	Memphis	Oklahoma City
Birmingham	Shreveport	Tampa
New Orleans		Miami

Write for Name of Nearest Agent

for today's **HIGH PRESSURE HIGH TEMPERATURE** *steam stations*



• Foster Type 38-SV Super-Jet Safety Valves for steam pressures to 3000 P.S.I. and temperatures to 1100° F are designed for boiler drum and superheater outlets, reheater inlet and outlets, and, as a relief or safety valve on soot blower installations, turbines, pressure reducing valve and desuperheater stations.

Foster Super-Jet Safety Valves are protecting boilers at 2700 P.S.I. and 1100°F, and are also in service at pressures as low as 10 P.S.I.

Foster Super-Jet Safety Valves have been selected because of their high relieving capacity, adjustability for minimum blow-down, and consistent popping at name-plate pressure. The outside frame rod construction makes disassembly possible without disturbing spring setting, permitting inspection and relapping of seats during a minimum outage time. Piston freedom can be checked at any time with the valve under pressure.

• Foster Automatic Non-Return Valves Type 2C are available for 250 P.S.I. and 475°F, Type 2S for pressures to 900 P.S.I. and temperatures to 900°F.

Designed to prevent a backflow of steam to a disabled boiler, piston assembly assures positive factor of safety. Main valve and seat rings are designed to permit full free flow of steam when the valve is in operation.

Foster Non-Return Valves have been in service since 1900 and today are installed in major steam plants throughout the country.

FOSTER ENGINEERING COMPANY
835 LEHIGH AVE. UNION, N. J.

AUTOMATIC VALVES • SAFETY VALVES • FLOW TUBES

DURAMETALLIC *Packings*

Write today for FILE No. DMSP describing the complete line of Durametallic wear-free packings.

Product of
DURAMETALLIC CORP., KALAMAZOO, MICH.
Also manufacturers of rotary mechanical seals, oil pressure systems and packing tools.

Allis-Chalmers—Va., N. C.

THE ELECTRIC MOTOR & MACHINE SERVICE, 518 W. Montgomery St., Henderson, N. C., has been named a distributor for ALLIS-CHALMERS motors, controls and "Texrope" equipment in Mecklenburg county in VIRGINIA, and in Vance, Franklin, Warren, Halifax, Wake, and Granville counties in NORTH CAROLINA.

The firm has also been appointed a certified service shop.

Principals are E. B. HALE, a partner, and C. S. HOLLAND, secretary and treasurer.

Koppers Acquires AL&T Co.

KOPPERS COMPANY, INC. has purchased substantially all stock of the American Lumber & Treating Co

The ten plants of A. L. & T., all of which utilize the pressure-treatment method of preserving wood with creosote or special salts, include those located at CROSSETT, ARK.; FORDYCE, ARK.; SHREVEPORT, LA.; BALTIMORE, MD.; FLORENCE, S. C., and GAINESVILLE, FLA.

No immediate changes are contemplated in the production or organization of the plants, but the A. L. & T. headquarters organization, which has been in Chicago, will be integrated with the headquarters organization of Koppers Wood Preserving Division in Pittsburgh.

Southern Textile Exposition Greenville, S. C., Oct. 4-8

The 18th biennial SOUTHERN TEXTILE EXPOSITION will be held at GREENVILLE, SOUTH CAROLINA, Oct. 4-8. A total of 280 exhibitors representing every geographical area in the United States and also from West Germany, Switzerland and England, will present machinery, equipment, and supplies in the 80,000 sq ft of space.

It is reported that machinery and equipment to be exhibited will strike hard at obsolescence, and that while there will be some "firsts" shown, nothing will be displayed that has not been actually proved under mill conditions. Increasing application of electronics to textile machinery and operations is expected to be an outstanding feature of the 1954 show.

A permanent annex, which contains 14,000 sq ft of exhibit space, has been completed this summer to supplement the annex built for the 1952 show. The additional area has permitted a more liberal appointment of space to exhibitors, according to Miss Bertha M. Green, long-time director of the exposition and secretary of Textile Hall Corporation which sponsors it.

New Lion Oil Plant—La.

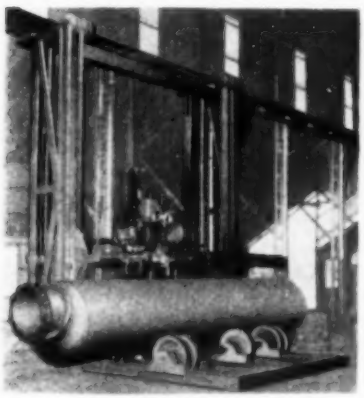
The first train-load of anhydrous ammonia was shipped late in May from THE BARTON PLANT, LION OIL COMPANY'S new chemical manufacturing installation near NEW ORLEANS. The plant, which has been under construction since mid-1952, has been in full operation since June.

With all facilities of The Barton Plant in full production, it is expected that shipments of anhydrous ammonia and pelleted ammonium nitrate will average about 600 tons per day throughout the year. By-product carbon dioxide will be utilized for the production of about 42 tons daily of dry ice and liquid carbon dioxide.

Nitric acid, an intermediate chemical in ammonium nitrate manufacture, is produced in a unit with capacity for 430 tons of acid a day.

Dallas Metalworking Plant Designs High-Speed Welder

The engineers of MASTER TANK AND WELDING, 1612 Singleton Blvd., DALLAS, TEXAS, have designed and constructed a welding machine capable of handling pressure vessels up to 120 ft long by 16 ft in diameter and weighing 100,000 lb.



It is all motor powered and works by remote control from a front panel, located next to the operator. The tank is rotated for welds around the circumference. The actual welding machine, with two welding heads travels under its own power on a track that is 120 ft long. Under the usual system, it is necessary to move the tank which is a time-consuming job on larger vessels.

Another time-saving feature is the speed in which the welding machine can be moved and adjusted. Electric power controls perform this task in a matter of seconds. This is the first machine of its type in the Southwest.

Unpopular fellow ...the pig in a poke...

You find a lot of sight-unseen horsetrading these days. Especially in the refractory business. You might, for instance, buy a perfectly good refractory product — and see original costs go up and up *and up* . . . through careless planning or construction. But when you call for Plibrico service, you're demanding a *complete* package.

First, Plibrico offers you a real planning and engineering service, including original design and blueprinting. Next, Plibrico's thoroughly experienced men select the refractories best suited — virtually custom-made — for *your* job. Finally, all a part of the same package, *responsible* Plibrico construction crews *finish the job*, quickly and economically. You may feel that you're paying a little more. But when you call for Plibrico service, you *know* you're getting your money's worth!

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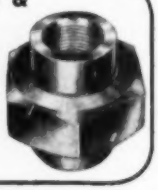

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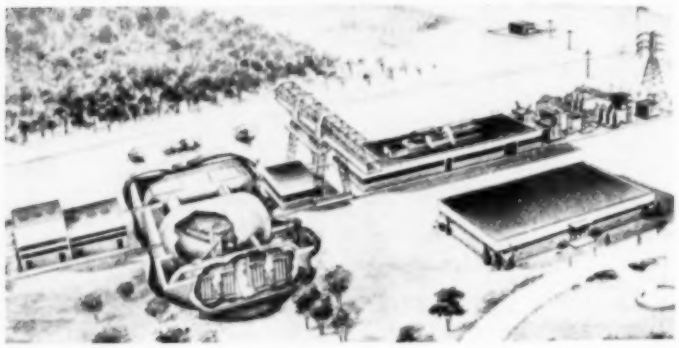

First Central Station Atomic Power Plant

THE above artist's preliminary sketch shows the nation's first central station atomic power plant which is to be built near Pittsburgh as a joint project of the AEC and Duquesne Light Company. Westinghouse Electric Corporation is designing and will build the reactor; Stone & Webster Engineering Corporation is designing the reactor containing structure with its foundations, and the fuel handling facilities; Duquesne Light Company is designing and will build the turbine-generator portion of the plant.

The plant will produce a minimum of 60,000 kw. The cost of electrical energy generated is not expected to be competitive with that produced in conventional power plants. In a sense it is a laboratory power plant which will point the way to more economical designs. For more detailed data check SP&I for May, 1954, page 142, where John F. Lee, SP&I's Consultant on Atomics, previewed the Duquesne Light Company's plant.

Dravo Opens Houston Office

DRAVO CORPORATION, Machinery Division, Pittsburgh, Pa., announces the opening of a southwest office at 1615 Blodgett Avenue, HOUSTON 4, TEXAS.

The Houston office will handle the sale of prefabricated steel and alloy piping for power plants, oil and gas transmission systems, refineries, petrochemical and chemical plants, and other manufacturing processes on an FOB or delivered and erected basis.

GEORGE R. BEIDLER, formerly of the Dravo New York Office, has been appointed District Sales Manager.

A-C Service Shop—Va.

THE VIRGINIA-CAROLINA ELECTRICAL WORKS, INC., 1007 E. Main Street, Norfolk, has been named a certified service shop for ALLIS-CHALMERS motors and controls in nine VIRGINIA counties.

R. C. DOREY, SR., is head of the company, which was established in 1922.

Automation Show Nov. 21-22

The world of the future, in which factories which presently operate with 2,000 employees may be manned by a few hundred and in which the three-day work week may be standard, will be previewed at the nation's first automation show November 21 and 22 at the Waldorf-Astoria Hotel, John Diebold, chairman of the show, has announced.

Mr. Diebold, who is also editor and associate publisher of AUTOMATIC CONTROL, said that 80 companies in the $3,000,000,000 field of control systems, components and services will be represented as exhibitors. The show will dramatize the possibilities of computers and control "hardware" and will also demonstrate what is being accomplished today.

Called the AUTOMATIC CONTROL EQUIPMENT SHOW, the gathering will be held for executives and engineers on a top management level rather than for technical specialists or the general public. It will be managed by Strauss, Spigler, and Kline of Philadelphia.

Allis-Chalmers—Ark., Ala.

THE POOLE ELECTRIC, INC., 405 Locust St., NORTH LITTLE ROCK, ARKANSAS, a distributor for ALLIS-CHALMERS controls, centrifugal pumps, transformers and "Texrope" drive equipment since July, 1950, has now been named a certified service shop for Allis-Chalmers motors, controls and transformers.

FREEMAN'S ELECTRIC CO., 1616 25th Avenue, TUSCALOOSA, ALABAMA, a distributor for Allis-Chalmers motors and generators, centrifugal pumps, controls and "Texrope" drive equipment since July, 1953, is now also a distributor for the company's transformers.

Frank A. Thomas Co. Expands Engineering Specialty Lines

FRANK A. THOMAS CO., Box 2235, SPRING HILL, ALABAMA (Mobile), has recently expanded its engineering specialty services to industrial, power and large service plants in the immediate Florida, Alabama and Mississippi areas.

Company now represents Alsop Engineering Corporation, The Annin Company, Jerguson Gage & Valve, Meriam Instrument, Industrol Corporation, Ledeen Manufacturing Company, Trinity Equipment Corporation, Wilkerson Valve Company, and Weksler Thermometer Corporation.

Florida Company Formed to Sell Fiberglas Products

Formation of the MODERN MATERIALS COMPANY of LIVE OAK, FLORIDA, to distribute and sell Fiberglas products throughout the state has been announced by Gil and Paul C. Baechle, brothers and partners in the business.

The company is also equipped for light fabrication and assembly work in industrial, commercial and construction fields through the facilities of the Paul C. Baechle Company which for the past 10 years has manufactured wood products for the Florida building trades and construction industry. It plans to develop packaged end-use products for the "do-it-yourself" market.

Paul C. Baechle will continue to operate the company bearing his name as well as participate in active management of the Modern Materials firm.

Gil Baechle, for 18 years was affiliated with Owens-Corning Fiberglas Corporation as research engineer, salesman, product division manager and district manager. From 1941, until he left the company recently, Gil Baechle was Branch Manager for the Fiberglas Corporation in Cincinnati.

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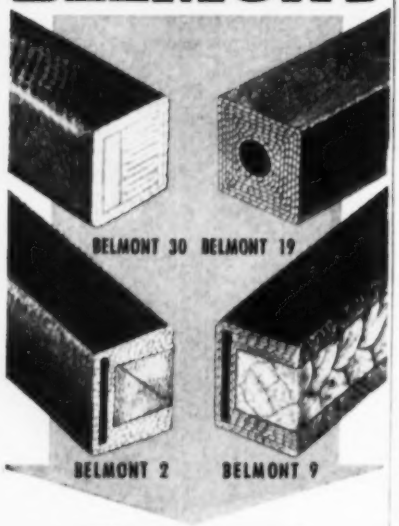

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Chemstrand's Integrated Nylon Plant—Pensacola

The new 50-million-pound-per-year Chemstrand nylon plant at PENSACOLA, FLORIDA, has been under construction for the past three years. In production since December, 1953, plant is now operating as the country's first wholly integrated nylon manufacturing facility. Approximately 2,500 persons are now employed and over 3,000 will be employed when it is in full production.

THE CHEMSTRAND CORPORATION is an associate company jointly owned by American Viscose Corporation and Monsanto Chemical Company and was chartered in 1949, to carry on research, development, manufacture and sale of synthetic fibers. In 1951, Chemstrand signed a license agreement with E. I. du Pont de Nemours & Co., Inc., covering nylon fibers and, at the same time, du Pont agreed to design and construct the nylon facilities for Chemstrand.

ROY G. HEMMINGHAUS, vice president and Chemstrand nylon plant manager, and FRED G. GRONEMEYER, assistant plant manager, are responsible for the activities at this installation.

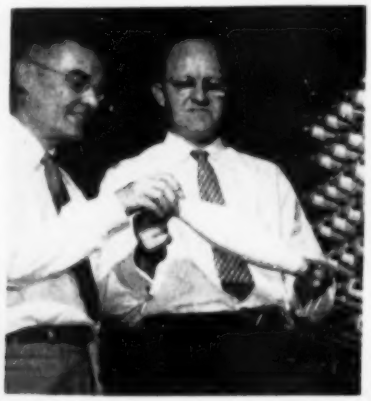
The entire project comprises two basic areas, the chemical area where the intermediates are produced and the textile area where the fiber is spun. Sixty-two separate structures of the most modern design, together with the necessary storage tanks, roads and barge unloading docks, comprise the combined facilities.

The chemical area provides facilities to produce nylon salt required by the textile area for the production of nylon filament yarn. In other nylon manufacturing operations in the United States, the intermediate chemicals are produced at separate locations and shipped to spinning plants situated elsewhere in the country.

The spinning building dominates the textile area and is operated by shift workers on a 24-hour basis. In front of the spinning building is the plant administration headquarters.

The chemical area occupies a plot 800 by 1,000 ft. Nylon salt is produced in this area. Other units required for a plant of this size include: laboratories, waste disposal, warehouses, maintenance shops, power plant, and storage tanks.

Chemstrand's nylon plant is served by highway, rail, water and air transportation. Some of the raw materials are received from the Texas Gulf Coast via the Inter-Coastal canal and Escambia River and others by rail and truck. Outgoing shipments primarily are utilizing rail and highway transportation services.



Henry H. Bitler, president of The Chemstrand Corporation (left) and Roy G. Hemminghouse, vice president and Chemstrand nylon plant manager, check a bobbin of Chemstrand nylon produced at the firm's Pensacola, Florida, facilities.

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National Power Show Moves to Philadelphia

Announcement has been made that the 21ST NATIONAL EXPOSITION OF POWER AND MECHANICAL ENGINEERING will be held at the Commercial Museum in Philadelphia, December 2 to 7. Transfer of the Power Show to Philadelphia was determined by a vote of exhibitors when Grand Central Palace in New York, where it has been held heretofore, was rented by the Government.

As in recent years, the exposition will be held under the auspices of the American Society of Mechanical Engineers, whose annual meeting is scheduled in New York, November 28 to December 3. For this reason, the exposition was jointly planned to open on Thursday, during the week of the meeting, and continue through Tuesday of the week following, except Sunday, when it will be closed.

Arrangements for the show are under the management of the International Exposition Company, of New York, with Charles F. Roth as manager, and E. K. Stevens, associate manager. Space has already been reserved by over 200 exhibitors.

Clark Equipment Dealers—Virginia, Kansas, Texas

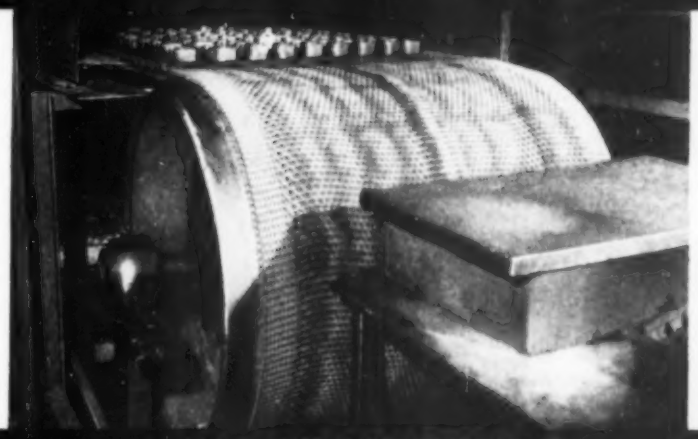
New dealers recently appointed to sell and service the Michigan line of excavator-cranes and tractor shovels, products of the Construction Machinery Division of CLARK EQUIPMENT COMPANY, include PHILLIPS MACHINERY COMPANY, RICHMOND, VA.; and ANDERSON EQUIPMENT COMPANY, HOUSTON, TEXAS. SAM H. DENNY ROAD MACHINERY COMPANY, WICHITA, KANSAS, will handle only the tractor shovels.

Conoflow Names Watts—Texas

CONOFLOW CORPORATION announces the appointment of THE WATTS COMPANY, 4101 San Jacinto St., HOUSTON, TEXAS, as exclusive sales representatives for Cono Controls in southeastern Texas and southwest Louisiana.

RALPH L. WATTS, principal of the organization, received his Bachelor of Science degree from Texas A. & M. He worked in the drilling department of the Taylor Refining Company at Alice, Texas, for a period and then became associated with the Duriron Company of Dayton, Ohio, serving as manager of their Philadelphia branch for three years. He later became Vice President of Small Parts Manufacturers Company, Barrington, R. I., until his return to Texas.

idea for AUTOMATION



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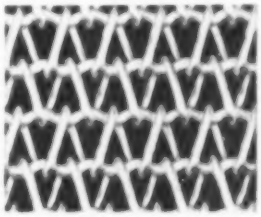

CAMBRIDGE BELTS are available in any metal or alloy. Thus, the belt recommended for you can be fabricated from the specific material that will give longest belt life under your operating conditions. In addition, Cambridge belts can be woven to any length or width and in a wide variety of weaves and mesh sizes to meet your needs.

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T-1 **POWER TRANSMISSION EQUIPMENT** — Catalog — Form 118, 24 pages—Covers complete line of variable speed equipment from fractional horsepower to 8 hp with a maximum speed ratio of 10:1 at 1750 rpm with no stops required for speed changes. Chapters cover variable speed pulleys; wide V-belts; sheaves; motor bases; countershafts; and Select-O-Speed transmission.—LOVEJOY FLEXIBLE COUPLING COMPANY, 4945-4999 West Lake St., Chicago 44, Ill.

T-2 **FLOOR TRUCKS**—Bulletin 56-A, 6 pages—Illustrates and catalogues a variety of industrial floor trucks for plant requirements in materials handling, with all models featuring versatile performance, quicker loading, smooth wheeling, easier steering, and manpower conservation.—TOWSLEY TRUCKS, INC., 1766 Elmore St., Cincinnati 23, Ohio.

T-3 **ROTARY UNION**—Bulletin No. 700, 16 pages—Illustrates and describes the all purpose ball bearing Rotary Union, a precision mechanical sealing device with a new design which permits field repair by the users without sacrificing performance.—PERFECTING SERVICE COMPANY, 332 Atando Ave., Charlotte, N. C.

T-4 **STUD WELDING** — "Cost Saver Kit"—Contains wall chart to facilitate selection and ordering of welding studs, with list of part numbers and dimensions of standard threaded MG studs and ceramic ferrules, special purpose studs, and related equipment. Includes manual on "How to Design for Nelweld," and a stud welding catalog.—NELSON STUD WELDING DIVISION, GREGORY INDUSTRIES, INC., Lorain, Ohio.

T-5 **HOSE COUPLING** — "Titeflex Quick-Seal Coupling," 16 pages—Describes a quick connect-disconnect hose coupling for water, oil, steam, gas and chemical lines, which provides permanent freedom from leakage, with illustrations, list of users, and other pertinent data.—INDUSTRIAL SALES, TITEFLEX, INC., Hendee St., Springfield 7, Mass.

T-6 **CRANE RAILS**—Bulletin 1971, 4 pages—Includes specifications and other engineering data on crane runway rails and accessories — angle bars, crane stops, rail clips, bolts, hook and anchor bolts, bearing plates. Gives ordering information.—L. B. FOSTER COMPANY, P. O. Box 1647, Pittsburgh 30, Pa.

T-7 **SCREW CONVEYORS** — Catalog ID-541, 4 pages—Illustrates and describes standard and unusual types of conveyors, with engineering data to guide the user in selection. Tables give sizes, types, speeds, and horsepowers. Conveyor accessories are also covered.—CONTINENTAL GIN COMPANY, Industrial Division, Box DJ-2614, Birmingham 2, Alabama.

T-8 **BOILER BLOWDOWN CONTROL** —Technical Paper No. 128, 8 pages—Principal types of boiler blowdown are discussed, as well as various control methods necessary to assure poduction of pure steam and the keeping of heat transfer surfaces free of scale and other objectionable deposits.—W. H. & L. D. BETZ, Gillingham and Worth Sts., Philadelphia 24, Pa.

T-9 **INDUSTRIAL CRANES** — Bulletin PT 1253, 8 pages—Describes line of Push-Type Cranes with new, improved construction features, including light duty model available in five different capacities, and heavy duty models available in seven capacities. Photogapha show plant applications.—INDUSTRIAL CRANE & HOIST CORP., 315 N. Ada St., Chicago 7, Ill.

T-10 **CAR HANDLING**—"Hemco-Motive" Bulletin, 6 pages — Describes a small gasoline-powered, instant-starting roadable locomotive engineered to meet every need for spotting, moving and switching railroad cars and on-rail equipment over reasonable distances under complete control. Illustrated with applicational photographs. — HEMCO MANUFACTURING, INC., Argonia, Kans.

T-11 **CENTRIFUGAL PUMPS** — Form 7287, 12 pages—Presents "Centrifugal Pump Fundamentals" in simple language and easily understood diagrams and illustrations; explains principles of operation and defines various terms used in pump calculations; works out typical pump problems. — INGERSOLL-RAND COMPANY, Cameron Pump Dept., 11 Broadway, New York 4, N. Y.

T-12 **INDUSTRIAL WASTE TREATMENT**—Bulletin WC-116, 4 pages—Schematic drawings, photographs, and explanatory text show how Graver equipment solves such problems as process and cooling water shortages, contamination of streams with plant effluents, and loss of heat and materials in discarded waters and process liquors in various industries.—GRAVER WATER CONDITIONING CO., 216 W. 14th St., New York 11, N. Y.

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T-13 **VARIABLE SPEED DRIVES**—Bulletin No. 796, 8 pages—Illustrates and describes a new variable speed drive recently added to the company's complete line of mechanical power transmission equipment, and featuring larger speed range, simple construction, positive locking, higher efficiency, and other advantages.—T. B. WOOD'S SONS COMPANY, Chambersburg, Pa.

T-14 **BALL VALVES**—Bulletin 159, 8 pages—Covers new line of manually operated ball valves, which are first being offered in sizes from 12 in. to 48 in. for shut-off service at pressures up to 150 psi, for waterworks and industrial applications. Illustrated.—S. MORGAN SMITH COMPANY, Valve Division, York 8, Pa.

T-15 **TROLLEY BUSWAY ELECTRIFICATION**—Bulletin No. 45, 40 pages—Covers the company's 60 ampere steel-enclosed trolley busway electrification system. Includes the new 20 ampere trolleys, an enlarged line of standardized curved track sections and other new items.—FEED-RAIL CORPORATION, 125 Barclay St., New York 7, N. Y.

T-16 **LOW VOLTAGE SWITCHGEAR**—Bulletin 6004 A, 24 pages—Guide to I-T-E low voltage switchgear, illustrated with diagrams and photographs, gives information on features, switchgear components, applications, specifications, and construction.—I-T-E CIRCUIT BREAKER CO., 19th and Hamilton Sts., Philadelphia 30, Pa.

T-17 **TANK CLEANING** — Bulletin, 4 pages—Explains how chemical solvents provide many advantages in cleaning tanks of all sizes, all shapes, and for all uses. Chart lists industry, tank description, surface cleaned, deposit removed, and reason for cleaning, to show typical examples.—DOWELL INCORPORATED, P. O. Box 536, Tulsa 1, Okla.

T-18 **CONTROL CENTERS**—Bulletin F 5265-1, 4 pages—Describes electric "Control Center" to improve engineering and installation of automatic controls for heating, ventilating, and air conditioning. Illustrated with diagrams and photographs of equipment and applications.—BARBER-COLMAN COMPANY, Rockford, Ill.

T-19 **STEEL SHELVING UPRIGHTS**—Bulletin 2748, 6 pages—Describes standard steel shelving uprights to be used with new or used lumber, and engineered for adaptability to individual plant requirements. Illustrates various models available and gives dimensions.—S. A. HIRSH MFG. COMPANY, 8051 Central Park Ave., Skokie, Ill.

T-20 **ELECTRIC POWER DRIVES**—Application Tabloid Bulletin, 8 pages—Presents photographs and application stories of Sterling electric power drives on machinery and equipment in food, metal, chemical, petroleum, and plastic industries; paper, lumber, and textile plants.—STERLING ELECTRIC MOTORS, INC., 5401 Telegraph Road, Los Angeles 22, Calif.

T-21 **CONTROL PANELS**—Bulletin No. 254, 4 pages—Covers control panels for use with weighing and materials handling systems, motor controls, machine tools, and plant processes. Illustrates 27 typical panels with company names of the specific installations.—RICHARDSON SCALE CO., Van Houten Ave., Clifton, N. J.

T-22 **BOILER BLOWOFF**—Bulletin No. 7391A, 12 pages—Describes automatic continuous blowoff equipment furnished in four typical arrangements to provide fuel economy, smaller quantity of blowoff, elimination of foaming and priming, reduction of make-up requirements, and less strain on boiler metal. Illustrated.—THE PERMUTIT COMPANY, 330 West 42nd St., New York 36, N. Y.

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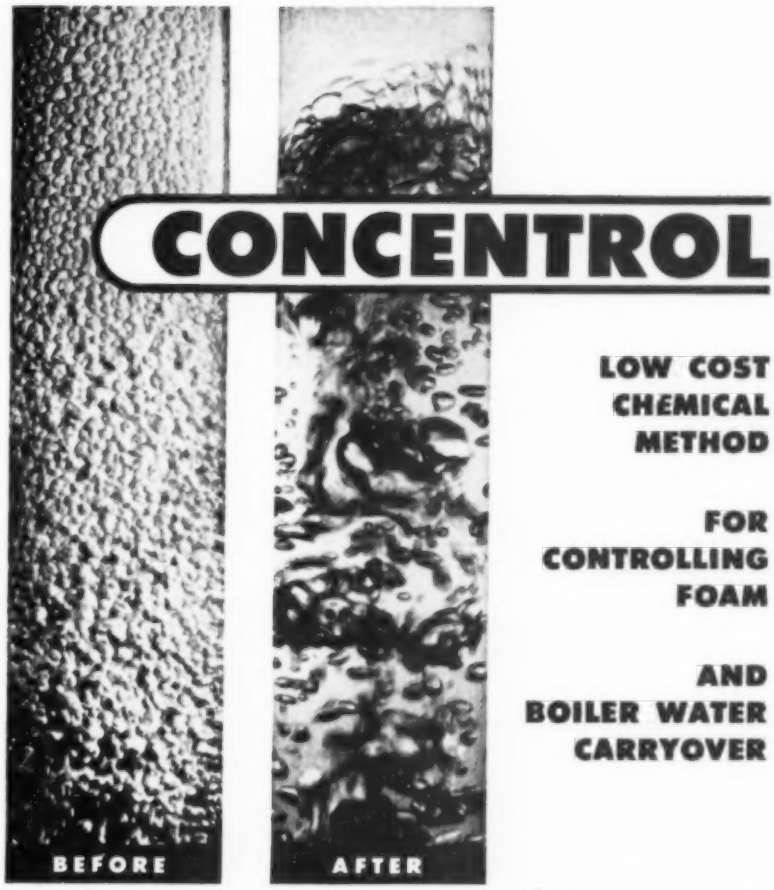

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Ore Pier Expansion

(*Starts page* 56)

master will set his scale for these cut-offs without opening the dial head. Seven photo-electric cells are mounted back of the head of the scale, and when intercepted by an opaque pointer, will open the feeder circuit. These cells are actuated by a selector switch on the operator's panel board.

Electrical Problems

Expansion of the ore unloading dock introduced several major electrical problems. The original installation was serviced by a 13,200 volt, 3 phase, 25 cycle overhead line transformed to 110 volt for lighting and through additional transformers, in conjunction with two old converters, to 600 volt d-c for operation of the two original towers. The contract with the power company provided that any additional power would have to be purchased at 13,200 volt, 60 cycle. A complete power analysis indicated that a series of electrical changes would be required until the entire dock ultimately would be serviced by 60 cycles.

The first step in the development was the purchase of a complete steel clad, centrally located 750 kw Westinghouse substation to receive primary power from two underground incoming cables. Power then passes through high voltage circuit breakers, a metering panel, and a take-off panel. The take-off panel feeds the new 1500 kw General Electric substation, which services the third unloading tower, electrical trimming devices, and miscellaneous power requirements in The Cottman Company's shop.

All equipment on Crane No. 1 operates on 550 volt d-c. All equipment except the weightometer and the lighting in the weigh house on Crane No. 2 operates on 550 volt d-c. The weightometer operates on 110 volt, 60 cycle, supplied by a small converter on this crane.

One of the most interesting electrical features of Crane No. 3 is the adjustable voltage control. It consists of a G-E, 6-unit, close coupled, sleeve bearing, motor generator set, with type T.S., 800 hp synchronous motor and individual generators for the hold, close, trolley, and tower motions. Driving motors are of the heavy duty, mill type construction. Full voltage starting is provided for the motor of the motor generator set.

The adjustable voltage drive uses amplidynes (rotating regulators) to produce refinements in peak torque requirements and simplification of control equipment with consequent reduced maintenance.

Power Transmission

(*Starts page* 82)

put speed may in any case be either constant or variable, as may also the output speed, making it possible to control between fixed limits to an infinite number of speed selections. Much more might be said of this if space permitted.

Variable Speed Hydraulic Couplings

There are hydraulic variable speed devices which are the out-

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growth of a change in design in hydraulic couplings. These couplings, first applied in automotive drives, are being increasingly used through industry. When the amount of oil contained in the working circuit of one of these couplings is varied, the amount of energy which is transmitted to the runner varies in proportion. Thus, by varying the amount of fluid in the working circuit progressively, stepless speed control is possible.

Where a coupling of this type has its working circuit full of oil, there is about 2 or 3% loss of speed between the driving and driven shafts, due to the fact that there is no actual mechanical connection. In some of these couplings designed for variable speed, it is possible to provide speed control from around 98% to 20% of the speed of the driver.

Oil is removed from the working circuit of the coupling for this purpose by means of an adjustable scoop tube. While running, the oil is normally held by centrifugal force in a rim around the outer part of the coupling casing. The scoop tube may be controlled by an external lever arm, though other methods of control and different types of scoop tubes may be and are used. Where controlled through an external lever arm, the lever swinging through an arc of approximately 90 degrees, the scoop tube pivots on an eccentric, in such manner that the point of the scoop tube is moved progressively into the rotating oil.

Thus, more and more oil is removed from the working circuit as the lever is moved more and more. Obviously, variable speed drives of this kind provide for very smooth starting (for which hydraulic or fluid couplings have always been noted) as well as for governing speed. It is also obvious that means can be developed for operating an external lever of the type mentioned automatically rather than manually, where such procedure seems to be indicated.

$$$ For Your Ideas

(See page 96)

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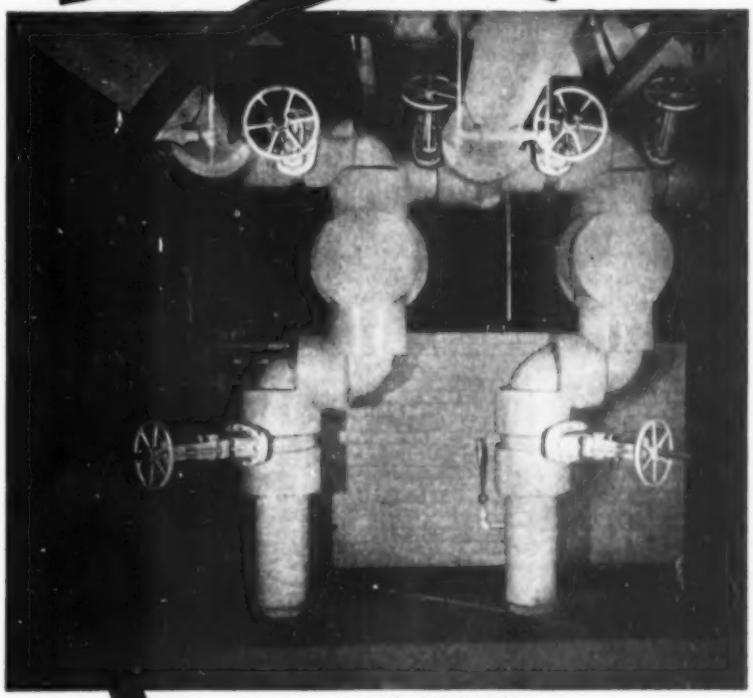

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Books for the Plant Engineer

Introduction to Nuclear Engineering

By Richard Stephenson
Published by McGraw-Hill Book Company, Inc.
330 West 42nd Street, New York 36, N. Y.
387 pages
Price, $8.00

Reviewed by John F. Lee, SP&I Consultant on Atomics

There is considerable difference of opinion as to what should be included in a textbook on nuclear engineering. The author is to be congratulated for writing a book which sticks to the subject and does not attempt to be a sketchy omnibus of all facets of engineering.

The first chapter is devoted to a concise review of nuclear physics which should be of valuable assistance to engineers in understanding the rest of the book. Other chapters cover nuclear fission, the nuclear chain reaction, reactor theory, radiation shielding, reactor materials, reactor control, separation of isotopes, chemical processing of radio-active materials, remote handling equipment, and special engineering problems.

The references are well selected to aid the reader in his search for further information. A number of examples and problems are included. Perhaps more examples of reactor design would increase the usefulness of the book. The material on shielding is the best in print.

In the opinion of this reviewer Stephenson's book should be a worthwhile addition to the library of the engineer who wishes to be brought up to date on this new branch of engineering.

Applied Atomic Energy

By K. Fearnside, E. W. Jones, and E. N. Shaw
Published by the Philosophical Library
15 East 40th Street, New York 16, N. Y.
156 pages
Price, $4.75

Reviewed by John F. Lee, SP&I Consultant on Atomics

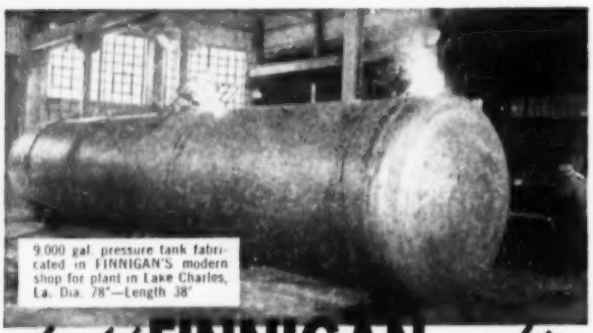
The purpose of this book is to present to the layman and the non-specialist an outline of the development of atomic energy and the uses of radio-active materials. The presentation is entirely descriptive and does not purport to be complete.

Nevertheless the book should be valuable as a means of obtaining a perspective of the field before consulting more specialized volumes.

Water Conditioning Data Book

Published by the Permutit Company
330 West 42nd St., New York 36, N. Y.
108 pages
No Charge (see below)

This new edition of Data Book No. 2478A has been brought up-to-date and completely revised. Subjects covered include: hydraulics; impurities in water; chemical conversions; coagulent, acid and alkali dosages; chemicals used in water treatment; water treatment processes; boiler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BY NORBERT L. ENRICK
PUBLISHED BY THE INDUSTRIAL PRESS
148 Lafayette St., New York 13, N. Y.
181 pages
Price, $4.00

This second edition contains additional text, tables, and charts to provide a more complete discussion of quality control. New subjects considered include the coefficient of variation; how to test a distribution for normality; how and when to use control charts computed from center lines; application of multiple control charts; use of acceptance control charts; interpretation of frequency distribution curves; where to use control charts for per cent defective product; and analysis of variations between machines and departments as an aid in locating sources of product difficulty.

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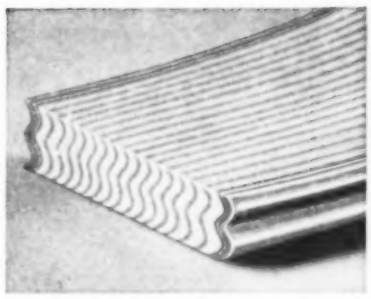
Metals and How to Weld Them

BY T. B. JEFFERSON AND GORHAM WOODS
PUBLISHED BY THE JAMES F. LINCOLN ARC WELDING FOUNDATION
Cleveland 17, Ohio
322 pages
Price, $2.00

This volume is a combination text and reference book prepared to give all users of welding a practical work knowledge and source of information for designing and making better welds at lower cost. Chapters cover elementary discussion of metals, their mechanical and physical properties and uses; fundamentals of metallurgy and their significance in heat treating and welding; correct welding procedures for steels, cast iron, nonferrous materials and hardfacing; trouble shooting, cost estimating, and explanation of welding terms.



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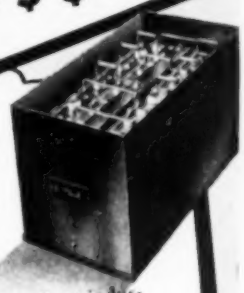

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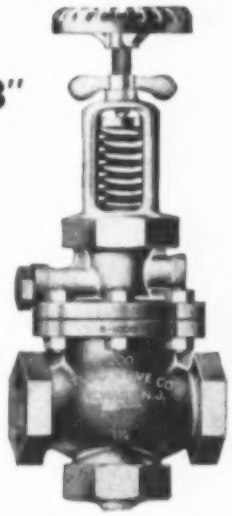

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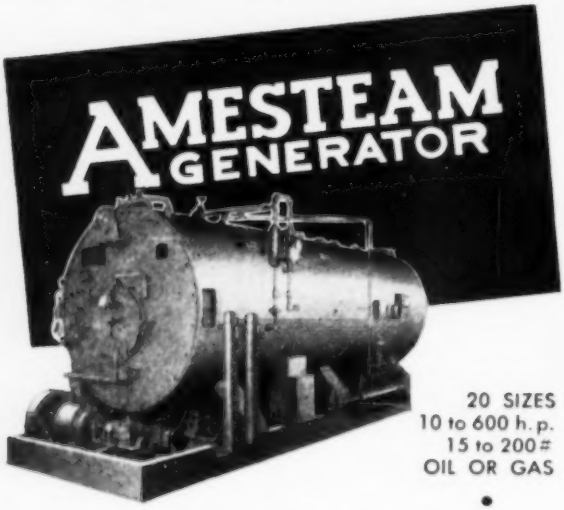

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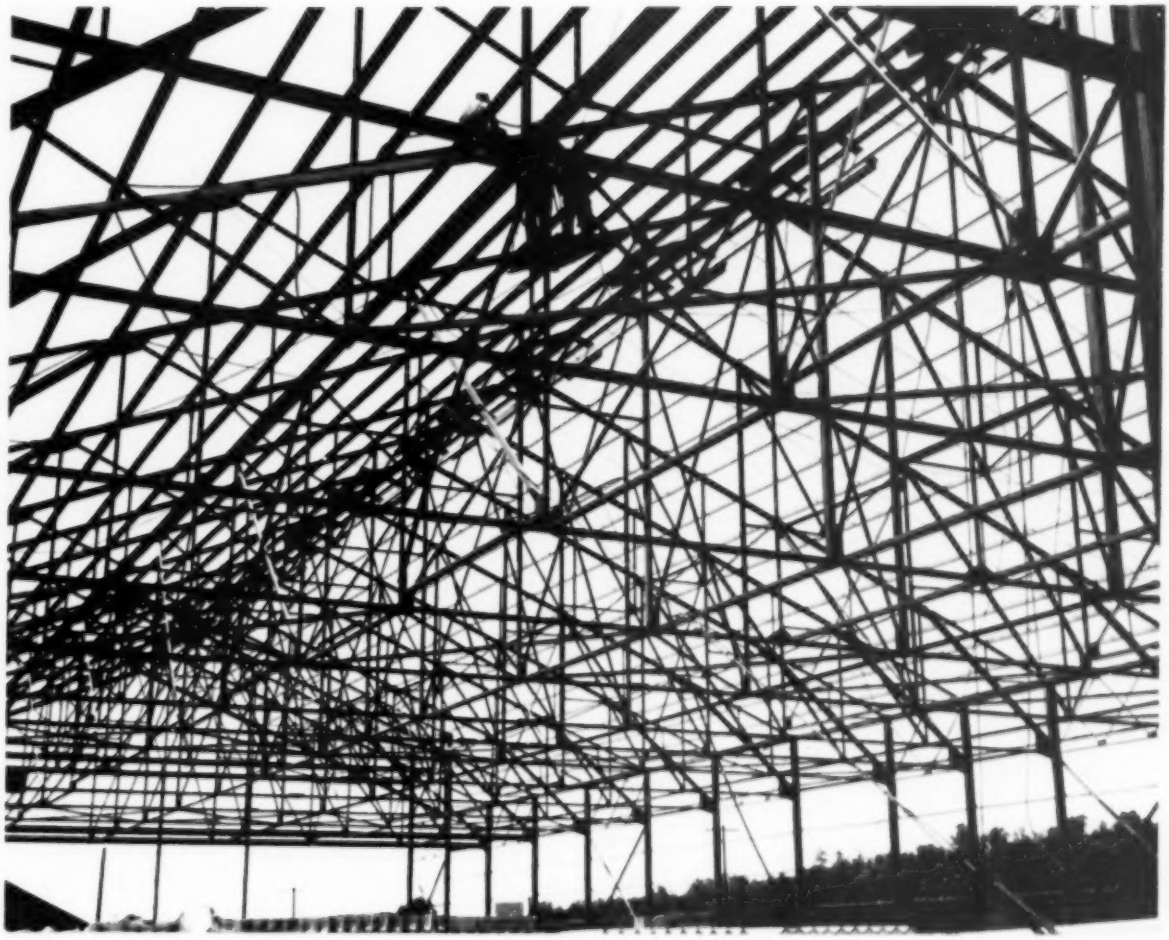

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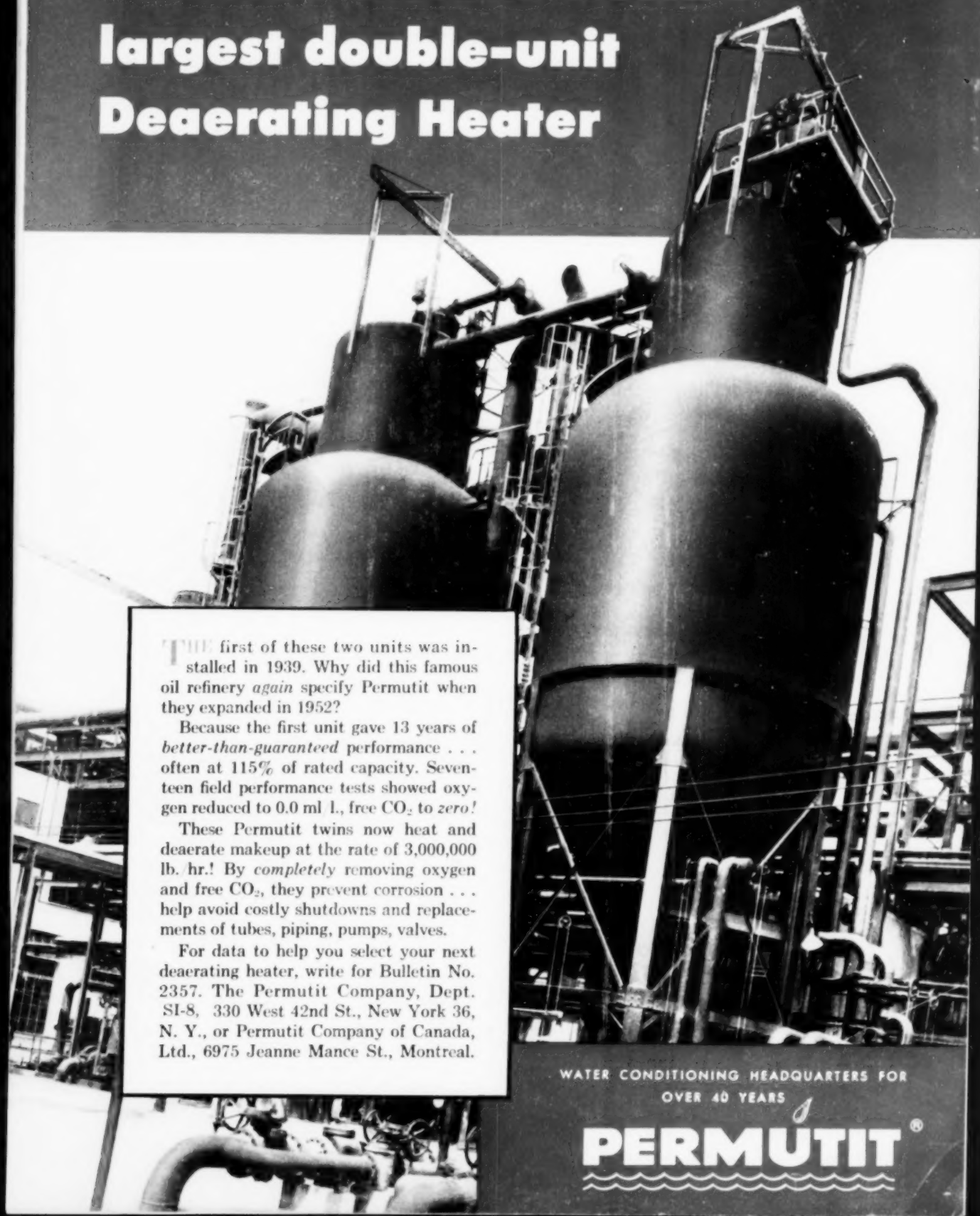

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